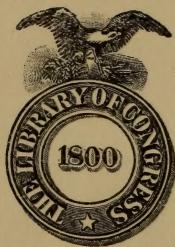


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First Lessons in Poultry Keeping.

BY
JOHN H. ROBINSON,
Editor of FARM-POULTRY.

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BOSTON, MASS.

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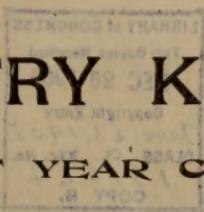
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FARM-POULTRY SERIES No. 8.

FIRST LESSONS IN POULTRY KEEPING.

FIRST YEAR COURSE.



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This series originally appeared in Farm-Poultry serially in 1905.
The second year course series is now running in that paper.

BY

John H. Robinson,
Editor FARM-POULTRY.

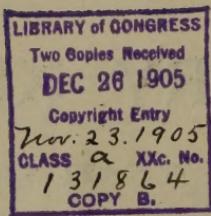
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First Lessons IN Poultry Keeping

FIRST YEAR COURSE.*

Introductory.

BEFORE taking up the regular work of this course every reader who intends to follow it through the year should consider carefully a few propositions about poultry keeping. These may not be in accordance with some ideas about it which he has absorbed, he knows not where; but if he is to get much benefit from these lessons he must accept them, at least provisionally, and pursue his study and carry on his work on the assumption that they are correct.

The first of these propositions is this:

(1). *Poultry keeping is a simple occupation in that it requires no great knowledge or ability.*

Among successful poultry keepers we find men and women of practically all grades of intelligence and all degrees of general capability.

Why then are there so many failures in poultry keeping? The answer to this question is suggested in our second and third propositions.

(2). *Poultry keeping is an occupation involving a variety of simple operations.*

(3). *Successful poultry keeping depends upon the regular, faithful, and general accurate performance of many small tasks.*

People fail in poultry keeping because they take hard and laborious ways of doing things that may be done easily; or because they entirely omit some necessary though simple feature of the work; or because they are irregular and spasmodic in carrying out a routine which theoretically is all that it should be.

Nine out of ten who have read this far will be ready to say:—"Why, that is all very easy; anyone can do that from the start."

It is right there that nine out of ten go wrong. An occupation involving many simple operations becomes complex if one and the same person has to carry on many of these operations simultaneously; and that is just the condition we have in poultry keeping. After one has learned these simple things and practiced them until the doing of them becomes almost mechanical, they come easy, but they have to be learned one by one, and time is required to become proficient in them through practice.

* These Lessons first appeared in serial form in FARM-POULTRY, 1905, in a course designed to run through several years, and are issued in pamphlet form for those who desire to preserve them in more compact form than in files of the paper; and for later subscribers to the paper who desire to do the first year's work either before or with the later course.

In this course of lessons we are going to take up the many different things that have to be considered as nearly as possible at the time when the poultry keeper has to think most about them in his work with poultry; and in this first year's work we are going to discuss them only as far as is necessary to make it plain what ought to be done—what general practice, or the best practice, indicates as best to be done.

The reader who will be content to let each lesson pass after he has got that much out of it will, I think, be the one who will get most actual value out of the lessons for the year.

Remember that these lessons are but one part of the course; the other part is the work each one is doing in his poultry yard. The purpose of this course is to supplement practical work, to help each one to form his plans and apply his energies for practical results, and to give him a better insight into the teachings of his own experience.

As we proceed there will be propositions laid down and rules given that a good many will at the time think extreme, but the great majority of beginners will find it to their advantage to accept these propositions and conform to the rules, for they will be based on what the experience of many beginners has shown is safe for the average beginner.

I know that there are few beginners who do not think they are going to be the exceptions, but the beginner makes a mistake when he assumes that. The better way is to take it for granted at the start that at the best one is likely to get only average results, and to stick to conditions that are safe, and to methods that make the work as easy as possible.

Here are three more things to think about:

The thing of prime importance is to make a success, however small, by some method, however simple.

A small success by safe methods is better, as far as learning from it goes, than strikingly good results by unsafe methods.

One can build safely on such a small success, while the longer he plans on the unsafe basis the more likely he is to fail beyond his power to redeem the situation.

Almost all readers will accept these as abstract propositions, but what I want of those who follow these lessons is that one and all keep their poultry keeping on a safe basis, and take only the unavoidable risks. If they will do that they will avoid many (I hope most) of the small losses that discourage the beginner. All should go slow in fact, as we will go in these lessons, on paper.

Remember we have plenty of time. This is not to be a ten lesson course, or a one year course. The first year course is only the beginning. We expect to take three full years to complete the course, digesting and assimilating facts, principles, and rules as we go.

There may be people who can learn faster than that, but a course of instruction should proceed at a pace adapted to the average, or, better, the slow student. Then the brighter and quicker ones can put their superiority to good use by doing better and more thorough work. You know the common fault of smartness is that it goes too fast for its possessor as well as too fast for others. In these lessons we want a pace all can hold, and that will hold all to their work.



I don't want to discourage anyone from reading as much about poultry and poultry culture as his interest in the subject may tempt him to read, and his time allow; but I urge every student in this course to make a thorough mastery of the particular facts presented in the current lesson, his first object throughout the year, and let all other poultry interests be secondary.

It will take but a little time — only a very few minutes a day — to learn the lessons in the paper. It will take hours of thinking and trying every day to put them into practice, and it is practice that makes perfect. The student can learn his lesson by rote in a very short time, but applying it in profitable practice is a very different matter. It is experience and experiment in the poultry yard day by day that gives him a real understanding of what he learns or reads. One can learn theoretically as much faster than he can acquire judgment and skill practically, as one can think faster than he can put his thoughts in good language. Keep this in mind. Reading increases one's information very rapidly, but thinking and working the same things over and over, make one thorough and skillful. In this is the true science of poultry keeping.

LESSON I.

Winter Rations For Laying Stock.

IN this lesson we consider methods of winter feeding of fowls kept for laying purposes.

Let the reader note first, that the food while an important factor, is but one of several factors in egg production: hence it is possible for hens that are properly fed on a suitable ration to fail to produce eggs, or to give a very unsatisfactory yield. Other matters affecting the egg yield will be considered, each in its proper place. In this lesson we confine ourselves to the treatment (1) of the properties of the principal staple articles of poultry food generally available at this season; (2) of the methods of feeding; (3) of a few good specific rations.

Principal Poultry Foods and Food Accessories.

The articles included under this heading may be grouped into seven classes, as follows:

- I. **Whole Grains.**—Corn, wheat, barley, oats, and millet.
- II. **Cracked Grain and Mixtures.**—Cracked corn and the prepared “scratching feeds.”
- III. **Ground Grains.**—Corn meal, corn chop, ground oats, wheat bran, wheat middlings, “mixed chop” (corn and oats ground together), “provender,” (a mixture of ground corn, oats, and bran), and the various brands of mixed ground feeds.
- IV. **Green and Vegetable Foods.**—Cabbage, cut clover or clover meal, cut alfalfa or alfalfa meal, and the common root vegetables.
- V. **Meat Foods.**—Green cut bone, beef, pork and mutton scraps, meat meals, and animal meals so-called.
- VI. **Food Accessories.**—Shell, grit, charcoal, and condiments.
- VII. **Drinks.**—Water and milk.

Considering these classes separately:—

I. Whole Grains.

Whole corn is to be fed very sparingly because the grains are so large that fowls fed it freely and often get too much of their ration without exercise.

Wheat and barley may be fed very freely.

Oats and millet are generally used in small quantities, as light midday meals. Ordinary lots of both contain so much unfilled grain that there is little advantage in using them.

II. Cracked Grains and Mixtures.

Cracked corn may be fed in winter as freely as wheat and barley. At usual prices it is the most economical grain food, and should be the major part of the grain ration in winter.

The various brands of mixed grains are composed generally of cracked corn, small and broken wheat, barley, oats, buckwheat, millet, etc. The economy and advantage of using them depend upon ease or difficulty of getting the needful variety of unmixed grains of local dealers, and upon whether the keeper gives the necessary attention to variety when buying his grains separately.

III. Ground Grains.

The corn products, corn meal and corn chop, are the most important of these, and one or the other is almost universally used as the basis of the mash. Corn chop being coarser is preferable for stock food, but in many places only meal can be obtained.

Mixed chop is a valuable food article, as also is coarsely ground oats, often purchased separately and used with corn meal and other stuffs in the mash.

The by products of wheat flour, bran and shorts or middlings are valuable and almost essential articles in making mashes. There is an unfortunate confusion in the use of the names of these stuffs, the term shorts, which is properly another name for middlings, is in many localities applied to bran, while the shorts are known as "white middlings" or "red dog," (sometimes red dog flour) according to color. White flour of quality unfit for household use is often used in mashes, and when obtainable at about the same price is to be preferred to middlings.

A number of mixtures of ground feed stuffs are on the market, and many users of them report good results; but it is better for the beginner who wants to learn his business to learn to mix stuffs before buying mixtures, then if a mixture needs to be altered to suit his purpose or the rest of his ration he will soon discover that fact.

IV. Green and Vegetable Foods.

The best of these, all things considered, is cabbage, but it cannot always be obtained at a satisfactory price. Indeed unless a poultryman has laid in a supply in the fall he is very uncertain of getting it. Then cut clover and alfalfa, and clover and alfalfa meal make excellent green foods, and can generally be obtained at reasonable prices. Potatoes, turnips, beets, carrots, onions, apples, etc., are useful when on hand or procurable at low prices.

V. Meat Foods.

While it is difficult to estimate relative values of meat foods exactly, and the quality of articles of the same name or brand is not always the same, green cut bone is generally considered the best of the meat foods, and would probably be used in preference to any and all others if it could be obtained in ample supply at a price which would not too much increase the cost of the ration.

Most poultry keepers use more or less of the prepared meat scraps, meals, etc. There are many brands of these, and they are of widely different feeding value.

VI. Food Accessories.

Shell seems to be indispensable for laying stock. Ground oyster shell is most commonly used.

Grit is generally given with shell, both being kept before the fowls, but while considerable quantities of it are often consumed, it does not seem to be absolutely essential to fowls supplied with shell.

Charcoal used as a corrective and blood purifier is kept before the fowls in granulated form by most poultrymen.

Of condiments, egg powders and foods, there are many, and they are very generally used by novices, and in a great many cases seem to contribute enough to results to justify their use. Their virtue is in tonic and stimulating properties. They help correct the novice's faults in feeding.

VII. Drinks.

Fowls should be liberally supplied with good water. So large a proportion of their diet consists of concentrated foods that an abundance of liquid is necessary to keep the digestive organs working freely.

Milk — sweet, sour, or clabber — may be given them as a drink, or mixed in the mash; but as a drink, milk is but a partial substitute for water, which should always be supplied.

The Food Supplies for a Flock.

For economy, and a simple system of feeding, the poultryman should use as few articles as is consistent with an attractive variety in the ration. For his mash he needs corn chop or meal, bran and middlings, or flour. Then if he supplies his hens with green food and meat food, as

he should, one grain will do, and if only one grain is used, cracked corn is to be preferred both for its feeding value at this season, and on the score of economy. If wheat or barley can be had at little more than the price of corn, one adds to his variety without materially increasing the cost of feeding, by using one or both, either with the cracked corn in a mixture or separately as one meal, preferably the noon meal.

For green food he should have either cabbage or cut hay, (clover or alfalfa), and consider one of these necessary. Such other vegetables as he can get at a right price should be used in addition.

For meat food, one article is enough if it can be had in constant supply, but because of the general variableness of supply of green bone, and the frequent occasions when it is inconvenient to prepare it, it is good policy to keep a supply of beef scrap or meat meal on hand for such emergencies.

Then of the accessories, shell is necessary, absolutely. The consensus of opinion among poultry keepers is that it is best to have grit and charcoal also constantly before the fowls.

To sum up. The necessities of life, when a mash is used, are corn chop or meal, bran, middlings, cracked corn, cabbage, or hay, (clover or alfalfa), one article of meat food, shell, grit, charcoal, and water.

To these may be added such other articles as are available for economical use.

Methods of Feeding.

Methods of feeding poultry may be classified as follows:

(1). **The Mash System**, in which a wet, scalded, or cooked mash is fed once each day, grain being given once or twice.

The mash may be given:

- (a) In the morning — the common way.
- (b) In the evening — as an important minority prefer.
- (c) At noon — the practice of a very few.

There is no evidence that the time of feeding mash makes any difference to the hens. It is a matter of the convenience of the keeper.

(2). **Dry Feed Systems.**

- (a) Dry mash, (ingredients same as in a wet mash), and grains.
- (b) All dry grains.

Dry feeding is used by many regularly where it is inconvenient to make and feed a wet mash, or when results from the use of mashes have been bad or unsatisfactory, as they often are when badly prepared, or ill balanced mashes are used, or when something in the rest of the ration does not work well with a mash. It might be used by many more occasionally to good advantage; as on an extremely cold day when a wet mash would freeze as soon as put down, or for a flock with mild chronic diarrhea.

The limits and scope of this lesson do not admit of a full discussion of feeding systems in the course of which it is necessary to consider the relations of the method of feeding to each and all of the many points affecting the welfare and productiveness of fowls, but the following condensed statement of the subject may aid the reader to decide what method will best suit him and his circumstances:

Advantages of the Mash.

The use of a mash serves these important purposes:

- (1).— As is indicated by the list of ground grains given, and as will appear more fully when recipes for mashes are given, the mash contains a variety of ingredients, and the proportions of these can be varied greatly, and the consistency of the mash also varied somewhat, thus making it possible to give considerable variety to the ration, as a whole, while using but one or two grains for the other meals.
- (2).— The mash being fed in troughs the feeder can gauge the quantities of it, and also of the other grains fed by the appetite the fowls show for the mash more accurately than in any other way.
- (3).— Through the mash the bulk of the ration may be increased, and the concentrated feed stuffs used diluted, (with hay and bran), and so rich foods used safely in larger quantities than if taken into the system undiluted.

(4).— Small potatoes and other waste vegetable most generally available for poultry food can best be fed in a mash.

Common Errors to be Avoided in Mash Feeding.

Whatever may be the advantages of a method properly applied, faulty application of it always involves possibilities of trouble which may become serious. In mash feeding these are:

- (1).— Too concentrated mashes; that is, mashes containing too large a proportion of the richest food elements, as meals and meat preparations.
- (2).— Too light and bulky mashes, that is, mashes composed mostly of hay and bran, which fill the crop without supplying sufficient nutriment.
- (3).— Too wet and sloppy mashes; and sour or moldy mashes.
- (4).— Feeding mashes too often. Experience has shown that more than one mash a day to adult fowls almost invariably and quickly produces indigestion.

Advantages of Dry Feeding.

In estimating the advantages of dry feeding, we have to consider some of them as, in a degree, apparent and theoretical rather than as actual, for it becomes clear, as the case is fully stated, that what seems a saving of time or labor is sometimes merely a shifting of labor from one place to another. We have then as the nominal advantages of dry feeding:

- (1). The saving of labor in making mashes.
- (2). Avoidance of the dangers of improperly prepared mashes.
- (3). Allows more variation in the time of feeding the meal, which takes the place of the wet mash, and so gives the keeper more freedom.

Errors to be Avoided in Dry Feeding.

The wet, or moist, mash fed daily, provides daily one feed which is practically a succulent food, and if properly prepared is a bulky food. In dry feeding:—If all hard grains are fed, the fowls get no extra bulk in them, and of course no succulence:— If a dry mash is fed they get some increase of bulk without succulence. Hence it is apparent that in dry feeding unusual provision must be made for bulky and succulent food—especially green food. Taking this as the principal fault of the system, we have:

- (1). Failure to supply sufficient succulent food.
- (2). Waste of food when ground grains are kept before the fowls in open dishes or hoppers.

Which System?

The writer has no hesitation in stating his preference for the mash system as in his experience and opinion the better system for most poultry keepers. He would therefore advise beginners to use that system unless such greater convenience as dry feeding gives fitted into their days' routine better.

As a matter of fact the two systems are nearly identical for all but one meal a day, and reduced to the last analysis the difference between them may be broadly stated thus:—

The use of a good wet or moist mash containing a variety of ingredients, makes it necessary to give more time and care to the preparation of this one meal, but in it provision is made for requirements of the fowl which when only dry feeds are given must regularly be specially provided for. The omission of a mash, or substitution of a mixture of ground grains dry, makes an economy with reference to the feeding of one meal each day, but makes it imperative that vegetable foods in abundance should be provided at other times.

As the careful reader will doubtless have observed, the two systems supply the requirements of the fowl in different ways. Each is in effect an offset for the faults of the other. The practice of the most skillful feeders is in effect a judicious blending of the systems. Some of the most enthusiastic advocates of dry feeding push it, not as the best method, but as easier and safer for the beginner. As there is nothing about poultry feeding too deep or too hard for any one of ordinary intelligence who gives the subject of feeding a little careful attention and notes the effects of his feeding on his fowls, the better policy would seem to be to learn to properly apply the mash system—unless, as previously stated—circumstances make it too inconvenient to work by that method.

A Few Good Sample Rations.

Having learned something of common food stuffs and their properties, we are ready to begin to feed fowls intelligently; that is, with some appreciation of the reasons for doing things in the way we do them. The reader should keep it clearly in mind all the time that while there are many possible rations that will give good results, there are also many combinations possible that will not give good results, and the way for the beginner to avoid a bad combination is to follow some one approved method, not attempting, as many do, to improve on the experts by combining features of different rations that have given good results. The sample rations given will cover all ordinary conditions, and the reader working by these lessons is advised to select that which suits him best, and follow it as closely as he can, departing from it only when he is absolutely sure that the change he makes cannot affect his results for the worse.

Let us take up first a few rations including a mash. As has been stated, it makes no difference to the fowls when the mash is fed. The feeder may time it to suit his convenience. The time of feeding the mash may, however, make a difference in the other meals.

Taking for our first illustration one of the most common rations in use, we have:—

Ration I. *Morning*.—Mash of corn meal, bran, and beef scrap.

Noon.—Wheat, barley, oats, or millet.

Evening.—Cracked corn.

Cabbage supplied practically all the time.

Grit and shell always before the fowls.

In this ration the morning and evening feeds are "full feeds;" that is, the fowls are given all they will eat. The noon feed is a light feed, say half as much as the evening feed of grain. The grains are fed scattered in litter spread over the floor of the house, so that the fowls have to scratch for them.

If now, one using the ingredients in this ration wished to feed the mash in the evening, he could simply transpose the morning and evening meals, making his system:—

Ration II. *Morning*.—Cracked corn.

Noon.—Wheat, barley, oats, or millet.

Evening.—Mash of corn meal, bran, and beef scrap.

Cabbage, etc., as in Ration I.

But if he wanted to feed the mash at noon it might be necessary to make some changes. For instance,—in either of the rations given above, millet or oats, both light feeds, and not eaten freely by fowls, can be used to good advantage at noon when, with full feeds morning and evening, only a light feed is needed. But if the mash is given at noon, and made a light feed, both the other feeds must be full feeds, and neither oats nor millet is suitable for regular use as a full feed. So the ration with a noon mash must be like this:

Ration III. *Morning*.—Wheat or barley.

Noon.—Mash of corn meal, bran, and beef scraps.

Evening.—Cracked corn.

Cabbage, etc., as in Ration I.

In this ration (a) the morning and evening feeds of grain should be full feeds, and the mash at noon a light feed or half feed, that is, about half wheat, the fowls will eat freely; or (b) all three feeds should be rather scant feeds. I would advise beginners not to use the noon mash unless for special and urgent reasons, for I think it is more difficult to keep fowls' appetites steady when the mash is fed at noon.

Instead of feeding one grain at a time, several grains may be mixed together, and the mixture fed once or twice a day. Suppose we make this change in each of the rations given, designating our substitutes by the same numbers with the letter A added. Then we have:

Ration I. A. *Morning*.—Mash as in Ration I.

Noon.—Mixture cracked corn and wheat, equal parts, (a half feed).

Evening.—Cracked corn and wheat, equal parts, (a full feed).

Cabbage, etc., as in Ration I.

Ration II. A. *Morning*.—Cracked corn and wheat, equal parts, (a full feed).
Noon.—Cracked corn and wheat, equal parts, (a half feed).
Evening.—Mash as in Ration II.
 Cabbage, etc., as in Ration I.

Ration III. A. *Morning*.—Cracked corn and wheat, equal parts.
Noon.—Mash as in Ration III.
Evening.—Cracked corn and wheat, equal parts.
 Cabbage, etc., as in Ration I.

Making a Mash.

No. 1. A Grain and Meat Mash.—

To make the mash used in the above ration, making it in small quantities, and by a method calling for nothing special in the way of utensils, proceed as follows:

For as much mash as can be readily mixed in an ordinary 3 gallon pail (preferably a pail of heavy tin, galvanized iron or granite ware), take 2 quarts of corn meal in the pail. Have a kettle of *boiling* water ready. Pour the water slowly over the meal in the pail, as you pour stirring with a long handled iron spoon. Pour on water and stir until you have a stiff smooth mash.

Now take the bran—about 3 quarts at first and stir it in, adding a little more if you find you can mix it. Perhaps it will take a quart more, and if the water was boiling and the meal swelled right, your mash should now be a stiff and rather brittle dough. Now put in the beef scraps or meat meal you wish to feed in the mash. The quantity you can use will depend on the character of the article, and also on the remainder of the ration and the constitution of the fowls, but in general fowls given all their meat food in the mash will take meat scraps or meal to the amount of about 8 or 10% of the dry bulk of the grain stuffs in the mash. That would be in this case, say about a pint of scraps. In many cases twice as much scrap may be given to advantage, but the above proportions are *safe*.

Having put in the beef scrap, stir until it seems to be thoroughly mixed. The mash is now ready to feed.

No. 2. A Vegetable Mash.—

We will call this a vegetable mash because the addition of cooked vegetables is all that makes it different from mash No. 1. Any waste vegetables or parings can go into it. Cook them in water until they are quite soft and will break up readily with the spoon when mixed with the other ingredients. For a pail full of mash take about 3 or 4 quarts of vegetables. When ready to mix the mash, have the meal in the pail as in mash No. 1, and pour the *boiling* water from the vegetables on it and stir as before. Then stir in the vegetables, bran and meat scraps as before.

No. 3. A Clover or Alfalfa Mash.—

In this cut clover or clover meal—or alfalfa or alfalfa meal—is used instead of vegetables. Two or three quarts of the cut dry hay may be used in a pail full of mash, and when hay is used the quantity of bran should be reduced until the meal and bran are about equal. The cut hay may be stirred into the mixture at almost any stage. It may be cooked for a few minutes in the water in a pot and the corn meal stirred into the water, or mixed in after the meal or after the bran or with the bran.

A Dry Grain Ration.

Ration IV. *Morning and Evening*.—Mixed grain as in ration III. A.
Noon.—Cabbage.

Beef scrap, etc., in hoppers accessible at all times. —

This ration could be varied by using one grain in the morning and another in the evening; or if fresh meat, raw or cooked, or cut bone was used, the noon feed might be alternately cabbage and meat, but the substantial meals of the day must be given morning and evening.

Dry Mash Rations.

In these a mash made of the same grain ingredients in the same proportions as the mash in Rations I., II., and III., may be used. The meat may be mixed with the dry grains or

fed separately. If mixed with them we could substitute the dry for the wet mash in each of these rations. For convenience and future reference we will repeat these rations here, making the substitution. We have then:

Ration V. *Morning.*—Dry mash of corn meal, bran, and beef scrap.

Noon.—Wheat, barley, oats or millet.

Evening.—Cracked corn.

Cabbage, grit, and shell always before the fowls.

Ration VI. *Morning.*—Cracked corn.

Noon.—Wheat, barley, oats, or millet.

Evening.—Dry mash of corn meal, bran, and beef scraps.

Cabbage, etc., as in Ration V.

Ration VII. *Morning.*—Wheat or barley.

Noon.—Mash of corn meal, bran, and beef scrap.

Evening.—Cracked corn.

Cabbage, etc., as in Ration V.

Before bringing this lesson to a close, I will give one more ration, including dry feed fed in a hopper:

Ration VIII. *Morning and Evening.*—Mixed grain, 1 part wheat, 1 part barley, 2 parts cracked corn.

Ground mixture, equal parts corn and oats, one-half bran added, always before the fowls in hoppers.

Cabbage, grit and shell always accessible.

This last is a ration for one who has little time to give his poultry. Its simple aim is to insure that the fowls will have enough to eat and a fair variety in food.



LESSON II.

**The "Hows" and "Whys" of Feeding Laying Stock
in Winter.**

IN THE preceding lesson we discussed poultry food stuffs and the systems of feeding with relation to their effect on the composition of rations. In this lesson we are to take up another class of questions on feeding, and try to give readers a useful understanding of these three topics:—

How often to feed.

How much to feed.

The relation of exercise to diet.

These three matters blend inseparably in practice, and we can hardly exclude anyone of them from a discussion of another. Yet to appreciate them correctly one must separate them more in his mind than he can in his work.

How Often to Feed.

Perhaps many are thinking that as all but one of the rations given in Lesson I. provide for three meals a day, the question of how often to feed is almost superfluous. It might be so considered if everyone was so situated that he could give his hens three feeds, corresponding to his own three meals, a day, but a great many poultry keepers cannot do this, so want to know what other arrangement is practicable.

For the short winter days two feeds a day would generally give as good results as three, but for one thing—the difficulty of keeping fowls in confinement interested in something, and out of mischief when there is too long an interval between feeds. Idle fowls contract vices of various kinds—such as feather and egg eating—besides gradually going out of condition from want of exercise. So whenever it is practicable to do so, it is advisable to give some sort of light feed in the middle of the day.

If, however, it is not convenient to do this, the noon feed may be either omitted or fed in the morning. Thus, in Ration I., the mash may be fed in the morning, and the grain for the noon feed fed at the same time, scattered in litter, and the fowls have something to keep them occupied through the greater part of the day. When cabbage or mangels are kept before the fowls, these things help to keep them occupied. So we may say that, provided some provision is made to give the fowls something to occupy their attention between regular meals, two meals will work as well in winter as three.

Feeding Once a Day.—I have had occasional reports from poultry keepers who could give their fowls attention only once each day, some in the morning and some in the evening,

and these sometimes are able to report good results, but, as a rule, those who get good winter egg yields look after the fowls oftener and regularly. One who has time to look after his fowls in the morning only may arrange this way:—

Mash, to be eaten at once, followed by grain for the remainder of the day, thrown in litter, and eaten as the fowls work for it.

One who has only the evening to attend his fowls by daylight may use this plan:—

Grain, to give a full feed in the morning, and something left to scratch for until well into the afternoon, may be thrown into the litter on the floor, either after the fowls go to roost at night or before daylight in the morning. Then the evening mash may be given just before dark.

Obstacles to Poultry Keeping When One Cannot Watch the Fowls.—The principal difficulties in the way of poultry keeping when one can give so little attention to the fowls by daylight come in in connection with other matters than the feeding of grain and mashes. Proper ventilation of a closed house is almost impossible when the poultry keeper is away all day, and it is a problem to keep water from freezing in a cold house. One who can attend to his fowls at noon can replenish the water supply, but one who cannot must use some kind of "anti-freezing" fountain.

On the whole I would not advise anyone to attempt much with poultry or encourage them to expect much from hens in winter unless the hens can have pretty good attention, for taking one flock and one year with another the winter egg yields are in proportion to the judicious attention given the flock. Hence, if the poultry keeper cannot make provision for some member of his family to attend to such wants of his fowls as he cannot look after, he must not think that failure to get results indicates something wrong with the fowls, the house, or the ration.

How Much to Feed.

This question seems to cause beginners more worry than any other connected with the subject of feeding. They find it hard to understand why fowls cannot be fed exactly by weight or measure. An explanation of this would require a much more exhaustive treatment of the subject than is appropriate in an elementary lesson; and the student must accept the fact and wait for experience and later lessons to furnish the explanation of it. An experienced feeder can tell a novice approximately how much to feed to average or medium sized hens.

How Much Mash.—Mashes vary so much in composition and consistency that the best rule that can be given is:—all they will eat up clean and quickly, that is in, say, fifteen or twenty minutes.

Some poultrymen leave mash before the fowls for several hours, or even give so much that they will not eat the last of it until noon, but it is better to give only what they will eat quickly and let them have grain, cabbage or roots to supplement it through the day than to give so much mash.

If fowls do not eat mash readily and freely, it is either because the mash is not palatable, or because the previous feed was too heavy, or the interval between the meals not long enough. Generally, a dozen fowls will eat about three pints of the No. 1 mash, (Lesson I.) and a third to a half more of No. 2 or No. 3 mash.

How Much Grain.—When grain is fed where the fowls can get it quickly, and with little effort, a pint is a fair allowance for eight or ten fowls. When it is fed in deep litter more than a full allowance must be in the litter if the fowls are to get their full feed within a reasonable time. In that case give about a quart to a dozen fowls. Thus in using Ration I. (Lesson I.) give at the rate of a quart of cracked corn to the dozen fowls, giving the corn in litter at least an hour before sundown. Then the fowls can get a full feed before dark, while what is left in the litter furnishes them something to work for in the morning, both before and after the mash is fed; while in Ration No. IV., a quart of grain given in the morning furnishes a good meal within an hour or so, and leaves something for the fowls to scratch for until the evening meal is given.

How Much Meat and Bone.—If sound sweet food of this class is fed regularly and often it is generally safe to give the fowls all they will eat, if the meat food is fed separately. Fresh meat may be used very freely in the mash, but the dried concentrated meat products must be used with some caution. (See "Making a Mash," in Lesson I.)

How Much Vegetable Food.—In winter it is practically impossible to feed too much vegetable food to fowls well fed on grain, because the appetite does not demand it, and they will eat green stuffs in much more limited quantities than in hot weather when heavy grain rations required to make eggs and growth are so heating that the fowls by choice fill up on green food which keeps them more comfortable, but does not always accomplish the results the poultryman is trying to get.

Good Feeding Means Heavy Feeding.

The longer I practice and study poultry feeding, and the more I see of the results of the feeding of others, the more I am convinced that the best feeding is not the most carefully adjusted ration, but the ration and the method that provides the fowls a little more than enough under conditions which require them to work for enough of what they get to give them the exercise they need to keep them in good condition.

A fowl can let a surplus alone, but has no way of making up a shortage—at least none that is satisfactory to the owner.

As between feeding short and overfeeding, I have seen good egg yields come oftener from the latter, especially with young stock; but there is little danger of bad effects from overfeeding if fowls have to take exercise by scratching for several hours a day.

Points to Consider in Determining Quantity in Feeding.

In deciding how much to feed, the poultryman has in the fowl itself three guides, three things that should furnish indications whether he is feeding right. These in the order in which it is most natural to use them are:—(1) appetite, (2) results, (3) condition.

Appetite.—The fowls should be ready and eager for each feed, even the light noon feed. If they are not there should be either a change of time of feeding or a reduction of the quantity given at the preceding feed. Frequently, poultrymen who feed the mash very early in the morning find that the hens do not seem to care for it at that time, though an hour, or even a half hour later, they will eat it readily. If the mash must be fed early, the night feed should be reduced until they will eat the mash, but it will generally work better to give the full feed of grain at night, and delay feeding the mash until the sun is well up.

Results and Condition.—If hens are laying well, the presumption is that the feeding is about right. In that case the point to watch is to see that the hens have food enough to keep them in good condition while laying. A hen that is in laying condition can hardly be overfed. If hens that presumably should be laying are not, the keeper should ascertain their condition by handling them. If not plump and solid they should be given more food, and richer food. If overfat they should be put on a diet of grain, and made to scratch for what they get until flesh is reduced. Egg production does not, however, depend entirely upon feeding, and the most that the poultryman can do is to keep his hens as nearly as possible in laying condition—that is, fat, but not so much so that the abdomen is packed with fat, and the hen either becomes sluggish or breaks down.

Exercise and Feeding.

Exercise by Scratching.—Throughout northerly latitudes the general provision for giving fowls exercise is by littering the floors of the houses with straw, hay, leaves, cut corn stalks, or any material in which the grain will bury itself, or with which it can be covered, so that the fowls must scratch for it. The proper use of litter calls for the same exercise of judgment as the adjustment of the meals or the determination of the proportions of the ingredients of the ration. Though errors both ways are numerous, the prevailing tendency is to use too much litter and compel too much exercise,—to make it so hard for the fowls to get feed that they

will work only for what is necessary to sustain life. One reason why some people get better results from evening mash is because the fowls get a full feed before going to roost, when if fed in litter (as they use it) they cannot get a good meal, or cannot get it in the time allowed them. Generally speaking, the depth of any loose and easily worked litter should not be less than three or four, and not more than six inches.

Exercise by Jumping.—A practice handed down since before the days when scratching litter was generally provided, is to hang a cabbage or fasten a root of beet or a piece of meat just out of reach of the fowls so that to get at it they must jump for every mouthful. I think this form of exercise of questionable value. A heavy hen carrying a lot of partly developed eggs is likely to be averse to taking exercise that way, or, if she does try it, to hurt herself, and it appears that sometimes jumping for exercise is responsible for the prevalence in a flock of corns and bumble foot, particularly when that is the only exercise provided, and the floors are not littered.

Exercise for Occupation.

So far we have considered exercise, especially with reference to its effects on the condition of the fowl, and as a check to rapid feeding. It serves another purpose which indirectly has quite an important relation to the matter of feeding as well as to production. The fowl with something to do keeps busy much of the time and is contented. With moderate exercise fowls probably more completely digest and assimilate their food, and are productive and keep in good condition on less food either than when not taking any exercise or when taking too much exercise. Contentment aids digestion and economizes food. But we need not depend solely upon exercise dependent upon eating. Fowls given the opportunity to do so will take vigorous exercise dusting themselves. In fact, when the sun shines in on the earth floor they will work and wallow there by the hour, and this exercise does them just as much good as scratching. So occasionally on bright days rake the litter clean from a space on the floor where the sun shines, and give the fowls a chance to put variety into their exercise.



LESSON III.

General Principles and Rules for Poultry Breeders.

LET us first understand clearly that a poultry keeper is not necessarily a poultry breeder. The terms *poultry keeper*, *poultryman*, *poultry raiser*, *poultry grower*, and *poultry breeder*, are commonly used as synonymous, but with the exception of *poultry raiser* and *poultry grower*, they are not wholly so.

Poultry keeper applies to anyone who keeps poultry, without regard to experience, skill, or success.

Poultryman applies to a poultry keeper considered as in some degree an expert.

Poultry raiser and *poultry grower* apply to persons merely hatching and rearing poultry.

Poultry breeder applies to those who regulate the reproduction of poultry.

One person may combine all these functions, but the number who do actually combine them is very much less than the whole number of poultry keepers.

I have been thus explicit in defining these terms because the first step toward right appreciation of what poultry breeding demands is correct understanding of what poultry breeding means. The breeder of a fowl is the person responsible for the mating of its parents. The matter of first and greatest importance in the breeding of poultry is that the breeder should know something of the natural laws affecting his work, should understand in a general way the principles upon which breeding systems, methods and rules are based; should know the characteristics and tendencies of the breed, variety, stock and individuals with which he works, and should apply his knowledge with judgment, faithfully and persistently.

This list of qualifications for poultry breeding may have a formidable look, but let no beginner be therefore discouraged. One need not be all this at the beginning. Indeed the list of qualifications presents an ideal rather than the complement of knowledge and experience which even the most skillful breeder brings to his work. Besides, these qualifications only come and grow by experience and use. No man ever had or can have a respectable practical knowledge of what a breeder must know without experience in breeding. Still a beginner need not feel discouraged by a realization of how much he falls short of the knowledge and skill of the expert breeder. As the saying goes, "What man has done man can do," and a few years of study, observation, and experiment in breeding poultry often make a man a very good breeder.

Two General Facts of First Importance.

The first broad fact to be considered in connection with the breeding of poultry is:—

That our varieties of poultry are all bred to artificial standards, to arbitrary, and often unnatural, requirements; that specimens perfect according to any such standard are virtually unknown; that in all varieties there are wide variations in individuals; that only a small proportion of an average good flock are of special excellence; and that a considerable number are not suited for breeding specimens of their own kind true to type.

This group of facts, which is given above as one general fact, is self-evident to the breeder of several years experience, but is so at variance with the common ideas of persons not familiar with the history and methods of the improvement of domestic animals and plants, that it needs to be specially emphasized here.

The idea prevails that breeds, varieties, strains and stocks of fowls are fixed, established so well that a poultryman who wishes to use a certain kind of stock has only to get that kind of stock and all will be plain sailing. That this is not the case the novice discovers very early in his work, but too often fails to realize what his discovery means. He frequently blames the breeder of the stock he begins with or the stock itself for unsatisfactory results, tries other stock with similar results, and perhaps repeats the process several times before he discovers our second important general fact, which is:—

That any grade of excellence attained in the breeding of poultry can only be maintained or excelled by continuing the same careful selection by which such excellence was developed.

A beginner cannot expect or be expected to do work that will rival that of the experienced breeder in the production of fine fowls, but he may easily produce fowls that if not of high excellence in the special features of their kind are still good fowls, and using the experience and results of expert breeders and relying upon their advice, he may produce fowls of very good breed or variety type.

The First Principle.

The foundation principle in all breeding to type or standard is, "Like begets like." This does not mean that all fowls of one breed or variety are exact duplicates. What it means is, that the qualities and characteristics of each individual fowl are derived from its ancestors and chiefly from its immediate ancestors.

This is one of those statements which at first may seem so self-evident as to make insistence upon it, or emphasis of the fact it declares absurd. To most beginners it seems like an insult to their intelligence to ask them to give the matter special consideration. But the beginner, no matter how clearly he may see the logic of the statement, cannot understand its real significance until he begins to study fowls for the purpose of mating them to produce what he wants in their progeny.

Then he finds that with breed resemblances go variety differences, with variety resemblances go strain or family differences, with strain or family resemblances go individual differences.

These individual differences are of varying character and value, and mark the fowl as an ordinary or a superior or an inferior specimen; or as ordinary, superior or inferior in a particular character or characters.

A fowl that is in all points ideal is so rarely produced that practically we do not have to consider the production of a union of two ideal specimens. What we have to do is to consider how to get fowls as nearly as possible of the type which is our ideal from fowls which while in a general way of that type depart from it in some particulars.

In practice the mating of fowls finally becomes a carefully studied system of balancing desirable and undesirable characters, of offsetting lack of development in a certain feature in one fowl by a full, or perhaps an exaggerated development of that feature in its mate or mates of the opposite sex, of securing certain points as a result of the union of fowls in which these points differ. All our established breeds and varieties of fowls have been made by breeders working in this way toward common ideals. Fowls that are not pure bred are for the most part results of breeding in which no intelligent selection was used, and as a rule will not transmit their characteristics with any such regularity and uniformity as is found even in ordinary thoroughbred stock. Because of this it is much better for a beginner in breeding poultry to begin breeding thoroughbreds than to waste his time with crosses or mongrels. For though the laws of breeding are always the same, the results of these laws in crosses and mixtures are often so confused that the breeder makes no progress either in the development of his stock or in knowledge of the subject.

Selection of Breeding Stock.

The first step in breeding upon the principle that like produces like, is the selection of individual specimens considered most suitable for the production of offspring of the desired type and quality. Selection should be based on the following points:

1. Constitutional Vigor and Physical Perfection.—Only healthy, vigorous specimens should be used for breeding purposes. No deformed or seriously malformed specimen should be used for breeding. There are some minor malformations not in any way affecting the health, vigor or practical usefulness of the fowl which should be treated as defects to be offset in the mate; but such things as crooked backs, crooked breasts, crooked legs, twisted wings, wry tails (that is, tails carried to one side) and squirrel tails (that is, tails carried too high and inclining toward the head) should be rigidly excluded from the breeding pen.*

There are some less serious malformations, perhaps more accurately described as lack of development, but as they are somewhat common in all varieties we will mention them here: Narrow and shallow bodies, pinched tails, and conspicuous lack of breast development, make a fowl unsymmetrical, detract something from its economic value as well as from its appearance, and often indicate lack of development of some of the internal organs. The breeder who carefully avoids using specimens having such faults rarely has cause to regret the loss of the use of birds attractive in other particulars which this severe selection rules out.

Breeding from Fowls that Have Been Sick.—This is a question which properly comes under the head of constitutional vigor. A fowl that has been very sick, though apparently completely recovered before the breeding season, should not be used to breed from, or if such a fowl is of such excellence that it is desirable to get stock from it if possible, it may be used, but the breeder should not rely on it for the stock he needs. The chicks from such parents are apt to lack constitutional stamina, and frequently are weak in the parts affected by the disease the parent had.

2. Breed Shape.—This is where the breeder's appreciation of the differences in shapes of fowls should begin. A fowl may be a well proportioned fowl, and not essentially lacking in physical development in any section, and yet not be at all of the shape considered typical for its breed. The breeder of thoroughbred stock should learn what is the ideal shape in his breed, and follow it as closely as possible in selecting for his matings.

3. Color of Plumage.—While it is almost universally conceded as theoretically right to place shape before color, in practice more fanciers give color the precedence, because color counts for more in the show room. This actual precedence given color, however, is detrimental to the practical qualities of some of the varieties, and, in general, destructive of distinctions in breed shape. Fanciers who compete with others in exhibitions where color is more important in awards, and prizes depend on extreme development of certain color characteristics, may find their success a justification of the use of breeding fowls of fine color but not at all of breed shape; but those who breed for practical qualities first, or for ordinary excellence in fancy points, will always find results, on the whole, more satisfactory if they give due precedence to breed shape in selecting their breeding stock.

4. Comb and Head Appurtenances.—The matter of selection with reference to these is, of course, selection for quality, as a bird not having these features of the kind characteristic of its breed or variety, would never be considered at all. These features are practically of little, if any, importance, but, in breeding exhibition stock, some of them are of very great importance. They will be specially considered in connection with statements about mating in the next lesson.

5. Color of Beak and Legs.—This is a point to which novices in general give undue importance, often selecting or rejecting on this more than all other points. Except as it may indicate healthy condition, color in these points has no absolute value; but considered as giving a finishing touch to a fowl, or as conforming with a market demand, it assumes some importance.

*Some breeders would consider this rule too strict, especially with regard to defects which are either not disqualifications according to the Standard, or the rules regarding them not rigidly enforced. While I admit exceptional cases where for the sake of other special merit a fowl with one of these faults might be bred from, I think it very evident that the general tendency is to be too lenient with such faults when selecting breeding stock, and that to this carelessness much of the weakness and lack of general attractiveness in some pure bred stock is due. The cases where the use of malformed specimens is justified by results are so few, and the cases where general results condemn their use so numerous, that it seems to me the net result would be much better if no exceptions to the rule were allowed.

These five points cover the things to be considered in selecting breeding birds on appearance. I think it is as well not to go beyond that in this year's lessons.

Novices' Errors in Selection.

The first serious mistake made by most novices in selecting breeding stock is to consider some particular feature, often a superficial one, as indicating purity of blood, and select with reference to excellence in that feature. With selection on this basis, goes rejection of specimens deficient in this feature. The result is the use for breeding of fowls which, for other considerations, ought to be rejected, and the rejection for a minor fault in one place of really valuable breeding fowls. The breeder must consider his matings first with reference to the more important points, then with reference to the others, and must carefully estimate the total breeding value of a fowl when the importance is given each point under consideration.

In general, this method of selection gives one breeding fowls of good all round excellence rather than birds of phenomenal excellence in one particular point, and it is the all round good bird that experienced breeders find most reliable in the reproduction of its kind.

Mating.

The breeder having selected from his flock such specimens as seem to combine a pleasing quality in desirable characteristics with not too marked possession of undesirable features, finds his task by no means completed. Instead, he is only now ready to begin the balancing of characteristics mentioned in the first part of the lesson as distinctively the breeder's work.

The specimens which he has selected are not all alike. Perhaps his selection has resulted in setting aside as possible breeders some specimens with very strong individual differences. It may be that his birds, if all bred alike, have some objectionable feature in common, or alike fail to show a pleasing excellence in a section of considerable importance.

Standard Matings.

Supposing the breeder has males and females of fair merit and nowhere notably deficient: if he is to make but a single mating it should be of the male he considers his best, with as many of the females as he considers suitable to mate with his male as the male is likely to be able to serve efficiently. This is what is called a "standard mating," that is, a mating of specimens of opposite sexes conforming most closely to the standard requirements for their variety.

Compensation Matings.

After making his Standard mating or matings a breeder may have left birds which may make very valuable breeders if properly mated, but if not suitably mated will have no special breeding value. These are, as a rule, specimens deficient only in one or a few minor points. Such specimens in fact as the breeder has whose stock is in some particular deficient.

If one happens to have fowls of the opposite sex strong in the feature in which these fowls are weak, and in other respects not unsuitable to mate with them, he may make such compensation matings; or if he can buy breeding birds likely to offset these defects in the progeny, it is well to do so, if he has room to give to chicks from experimental matings of this kind, but it is poor policy to make a number of matings of different types of stock with the expectation of having radical defects on one side offset by special excellence on the other. The reasons for this cannot be given in the limits of a lesson like this, but the breeder who tries making many matings in expectation of getting something from all his stock will shortly realize, if (as he should) he keeps records of his matings, that taking one season with another he will produce more good stock from one mating of his best specimens than from ten times as many specimens mated up in a variety of compensation matings.

While even a "Standard" mating introduces in a degree the compensation principle in the balancing of defects; with close selection, this balancing is within comparatively narrow limits, and does not present the radical individual differences too often found when matings are in reality crosses of extreme types of the same variety. Such extreme matings are always experimental, and as a rule are profitable only when the object is to preserve in the stock special excellence appearing in an individual which also has faults which make it unwise to mingle the blood of this individual with that of the general stock, or make it dominant in it, before the special defects of the fowl have been to a considerable degree eliminated.

The field for the exercise of skill and good judgment is a very large one. There is practically no limit to experimenting in making matings if one undertakes to discover all the possibilities a study of his fowls suggest, but the practical breeder soon learns to confine his production to what he can get from the matings which will probably give him good results, and the beginner may well pattern by him, and give little attention to possible results of matings made merely to utilize birds for breeding purposes.

The Double Mating System.

The system of special matings or double matings, so called because exhibition types of the sexes are produced from different matings, is a system of matings for color, devised to produce color types required by the established standards, but rarely obtained in both sexes from the same mating. It will be more fully explained in connection with descriptions of matings for varieties with which it is practiced. Where this system is generally used for any variety, the beginner will find it is to his advantage to follow it, regardless of whether he considers it wrong in principle.

Should a Novice Make His Own Matings?

It will have occurred to many readers that it would be of material advantage to every novice to have the benefit of expert advice in mating his fowls.

There can be no doubt that this is so, and that where the results of his matings has an important relation to the finances of his poultry keeping, the expense of securing the services of an expert for this work might well be considered a necessary expense, and the expert engaged, unless to do so would involve cost entirely out of proportion to the stock kept, in which event the breeder is wisest to do the best he can for himself.

MISCELLANEOUS INFORMATION.

There are a number of general questions about matters relating to the breeding of poultry, which do not come under any of the topics we have considered. These we will take up here, and treat as briefly as possible, and yet make the points involved clear.

(1). The Age of Breeding Stock.—

Under this heading we have a number of common questions which are given herewith, with reply following each.

(a). *At what age is a fowl fit for breeding?*

When full grown and well developed sexually. A cockerel will generally serve hens long before he is full grown, and will fertilize eggs. A pullet will often lay before she attains her full growth. Such immature stock should not be bred. It will produce, but not often stock that in size and stamina will approach the offspring of better developed stock.

(b). *At what age does a fowl cease to be fit for breeding?*

The age varies greatly. In general, the smaller breeds remain capable of breeding well longer than the larger ones. Then the use of the same stock for laying and breeding purposes, and the custom of giving the males as many mates as possible tend to greatly shorten the period of usefulness of the fowls as breeders. Many fowls are serviceable breeders for only one season. Generally two seasons breeding is as much as can be relied upon. A few fowls breed well for much longer periods, but the fowl that is of value enough to the breeder to be used more than two seasons is the exception.

(c). *Should fowls of the same age be bred together, or is it better to mate old males with young females, and young males with old females?*

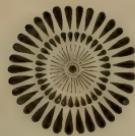
It is a mistake to make too much of a point of the relative age of the sexes. If the young birds are well grown, fully developed, and in good condition, they will produce as good chicks as old birds. It is really a question of condition rather than of age—or a question of age only as age may have affected condition. Young stock of both sexes is much more reliable for fertility early in the season. An old cock will sometimes not fertilize eggs at all till toward spring, and old hens often give very unsatisfactory results in fertility, even though laying well, early in the season. The advantages sometimes found in mating old stock of one sex with young stock of the other, is that if the old is a little sluggish, the greater vigor of the young may increase fertility, while if the young is not fully developed the effects of immaturity are to some extent overcome by the better development of the other sex.

(2). Relative Proportion of Males and Females.—

The breeder who follows the suggestions that have been given in regard to selection, will not often find it necessary to ask the limit of the number of hens to be allowed to one male, because he will mostly find only a few hens like enough to be used in one mating. Where the rules given are observed, where only such fowls as are suitable are mated together, matings are almost invariably small, and in most cases there is no need of allowing the male more females. If occasionally a male is found which mated with a few females annoys them too much by excessive attentions, tone him down by allowing him to run for a day occasionally with a larger flock of hens not used for breeding, and not kept continuously with the male.

Line Breeding and Inbreeding.

These are topics to be treated at length at a more advanced stage in the course. For the present I would say of line breeding only that if one buys line bred stock he should follow as closely as possible the same line of breeding; and of inbreeding that if one selects his stock carefully with reference to constitutional vigor and physical perfection, and avoids mating birds with the same, he need have no fear of immediate bad results from inbreeding, and may mate in absolute disregard of possible evil from mating birds of near kin.



LESSON IV.

Putting Principles of Breeding Into Practice.

THE last lesson stated some elementary principles of poultry breeding and discussed them in a general way. In this we are to consider more specifically the details to which those principles apply and the methods of their application.

In discussing the selection of breeding stock we found five points upon which selection should be based, namely:

1. *Constitutional vigor and physical perfection.*
2. *Breed shape.*
3. *Color of plumage.*
4. *Comb and head appurtenances.*
5. *Beak and legs.*

The first of these points needs no further explanation at present. Discussion of it along the lines followed for the other points would merely be a statement of the average relative vigor, hardiness, etc., of the different breeds, and on these points the differences that concern the breeder do not follow breed and variety divisions. On the other points there are a few things not mentioned in the last lesson to consider before special rules for mating are given.

Breed Shape.

The first thing for the novice in breeding to learn about the shape of the breed he is to work with is what is the typical shape for that breed. To appreciate it correctly he must also know something about the types of form for other breeds, for our ideas of form in fowls are always relative.

We find among fowls, even of the same breed and variety, great diversity of form, due largely to the general neglect to give shape due importance in mating and judging. Some of these forms are pleasing, some are not. A few of them have been chosen as models for particular breeds, and however disregarded in practice are still recognized as correct standards, and easily recognized as distinct and distinctive forms. Not all breeds have such dis-



Light Brahma Cock.



Buff Cochin.

sion a well shaped specimen gives is of massiveness. The Langshan is of quite different type, not so massive looking as the others, shorter feathered, higher stationed, a big, well built but rather spare fowl. A comparison of the cuts which accompany this lesson will show the type differences quite plainly.

2. The Mediterranean types.

The principal types of this class are the well known Leghorn and Minorca types. The Leghorn is a fowl of graceful carriage and fine curves yet with quite a substantial body. The Minorca is larger with more angular curves, and longer, straighter lines. The other breeds in this class are the Ancona, which is a Leghorn in shape; the Black Spanish, much like the Minorca, but with less breadth and depth of body; and the Andalusian a type intermediate between the Leghorn and Minorca.

3. The American types.

We may speak of the American type or of American types. In a general way the fowls of the American class are of the same type, a type intermediate between the Asiatic and Mediterranean types. But in the several breeds of fowls in the American class we have clear sub-types. Thus the Plymouth Rock has a rather long and deep yet well rounded body; the Wyandotte, a chunkier, rather square body. The Rhode Island Red standard calls for a body intermediate between Plymouth

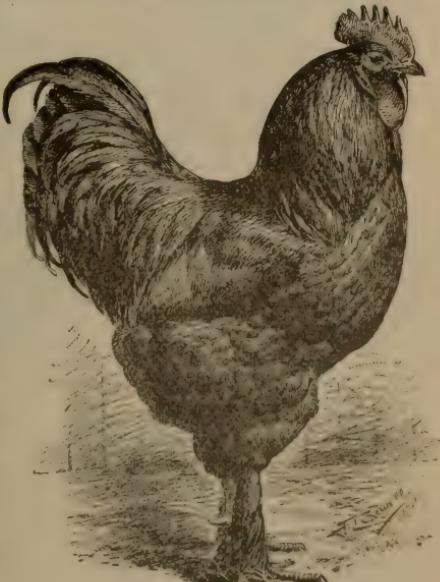
tinctive forms, but many do have, and the breeder with a little effort trains his eye to recognize each wherever seen, and to give it due credit when found in the variety or breed to which it belongs.

Dividing fowls (exclusive of Bantams) according to the more plainly apparent breed shapes, we have:

1. The Asiatic types.—

Of these there are three, each breed in the Asiatic class having distinct breed shape. These three are: The Brahma, Cochin, and Langshan.

The difference between the Brahma and Cochin is largely due to the difference in plumage; the standard Cochin being an extremely heavily feathered fowl, so much so that the female looks round as a ball, and the male also suggests the appearance of having more feathers than he can use to advantage. The Brahma is a closer feathered bird, and appears to have greater length of body. Both fowls are large, and the first impres-



Black L. as an C. ck.



S. C. White Leghorns.

4. *The Orpington type.*

Intermediate between American and Asiatic types.

Then we have in the Dorking and the Houdan, two breeds of different classes but with a conspicuous resemblance in shape of body. We make them:

5. *The Dorking-Houdan type.*

The characteristic of the shape in these two breeds is the full breast and rather long keel, giving the body some resemblance to that of a duck. This is most pronounced in the Dorking, which is the larger of the two breeds, and often a very massive fowl, but is also easily distinguished in some Houdans, though others seem entirely lacking in this feature.

6. *The Hamburg type.*7. *The Polish type.*

These two types are somewhat similar, both small, fine boned, very symmetrical and stylish looking fowls, very energetic and nervous. The Polish more round and plump; the Hamburg, in the larger specimens, sometimes suggesting the Minorca or Dorking.

8. *Game types.*

Under this heading we have three

Rock and Wyandotte types, and though specimens conforming to that description have been rare in the past, more and more of them are seen each year. Breeders of these breeds should carefully distinguish the different types. Of the other American varieties the Java is of extreme Plymouth Rock type, while the American Dominique does not properly belong to this class of fowls.

Some of the types which in a natural classification of the subject should follow these cannot be so easily placed or grouped, the divisions according to shape not following Standard classification. For this reason it is sometimes more difficult to give the type an appropriate name. Thus we have in the Orpington fowl a more massive American type, many of the Orpingtons being conspicuously "Cochinny," but other differences make it seem inadmissible to put the Orpington in the American type class, so we must put it by itself as:



S. C. Black Minorcas.

pronounced types: the Pit Game, a compact round bodied, rather fine boned fowl; the Exhibition Game, an abnormally elongated type of the Pit Game; the Indian Game, a heavy, massive Game type, apparently an intermediate between the Pit Game and Asiatic types.

The breeder will find in every breed many specimens which are not of good breed shape; many that approximate it; a few that are fine models of their type. Whatever his breed he should study shape, and learn to distinguish shape of body as readily as shape of comb or color.

Color of Plumage.

Generally speaking, novices in poultry breeding are not so likely to make mistakes in color as in shape. Color differences are more pronounced. In white and black are presented extremes of color, which are exact opposites, while the most extreme shape types are in reality similar types. Differences in shape resemble rather differences in shades of the same color. Hence we find fanciers easily making the broad distinctions between color types, but when they come to the finer distinctions meeting the same difficulties they do in working with shape.

The colors and color combinations in poultry may be classed as follows:

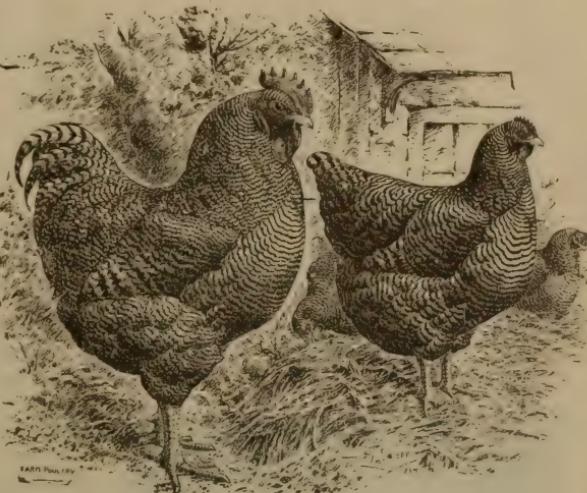
1. *Solid colors.*—White, black, buff and red.

2. *Parti-colors.*—Which

may be sub-divided according to the character of the markings into barred, laced, penciled, spangled, and mottled plumage in varieties in which one or both sexes retain the same colors and markings through all sections; while in varieties where the colors vary systematically in different sections, we have combinations, such as the black-red combination seen in the Black Breasted Red Game and the Brown Leghorn, the descriptive name being the color description of the

male. Following the same method of describing the color type we would have a black-white combination in the Silver Duckwing Leghorn and Silver Gray Dorking, and a white-red combination in the Red Pyle Game.

A complete classified description of colors would be too elaborate for this stage of the treatment of the subject, if indeed it would be of any special use at any time, but it is worth while for a breeder to make sure that he distinguishes between the different arrangements of color, and clearly understands just what he is trying to do. A good many breeders in the beginning pay little attention to the study of markings. They merely see certain color effects without knowing how they are obtained, and for want of a proper appreciation of the color qualities of their fowls not infrequently make the mistake of breeding from specimens not suitable for their purpose or neglecting to use valuable specimens. Color is not to be sought at the sacrifice of more substantial qualities, but if it is worth while to breed a variety at all, it certainly is worth while to know its color requirements thoroughly, and so be sure that specimens that are good in color as well as in other features will not be neglected. So I would urge the novice in any breed to study his color description with live models before him, and make sure that he knows just what the colors should be in each section.



Barred Plymouth Rocks.

Comb and Head Appurtenances.

There are four principal types of comb:

(1). *The Single Comb*, a single, upright, serrated comb, in some varieties very small, in others medium in size, in still others very large, but the general type always the same.

(2). *The Rose Comb*.— By persons not familiar with the technical terms of poultry men, every comb that is not single is commonly called a double comb; the rose comb is the most common type. It is a thick, fleshy comb, flattened on top, sometimes small and "neat," as the typical Wyandotte comb, larger in the Leghorn and Hamburg, and in the Red Cap so exaggerated as to seem almost a deformity.

(3). *The Pea Comb*, a triple comb, looks like three parallel single combs growing from the same base. Seen in its best development in the Brahma.

(4). *The Leaf Comb*, a forked or branching comb, as in the Houdans and Polish.

In one way the comb is of no practical importance. In itself it has no actual value. Yet a good comb adds much to the appearance of a fowl, and without developing fine combs at the expense of other features it is possible by simply avoiding the use for breeding of birds that have poor combs, or combs out of proportion to the size most favored for a variety, to add much to the appearance of the flock.

Wattles.— These are the folds of skin pendant from the lower beak, and of the same quality and color as the comb. They vary much in shape and size, and due regard should be given to the selection of birds having wattles such as are desired for their type.

Ear Lobes.— The folds of skin just below the ears. It is always desired and generally required that they be uniform in color—either red, or white, or creamy white. The tendency is to mix red and white. As with all superficial points, while not to be

given undue importance, color of ear lobes should not be neglected. If neglected for a few years it is very difficult to eradicate red from a lobe that should be white, or white from one that should be red.

Crests and Beards.— Comparatively few crested fowls are bred. If one does breed fowls of that type he ought by all means to avoid using birds with poor crests, however good in other respects, for unless the crests of your fowls are ornamental, there is no object in having crested fowls.

Beak and Legs.

Beak.— In general the shape of the beak of a fowl conforms to the structure of the fowl, and if one observes that the beak of a specimen be considered typical in shape of body does not conform to the description of the typical beak for that kind of fowl, he



White Wyandottes.



S. C. Rhode Island Red Hen.

needs to reconsider his judgment on shape — perhaps to find a new standard upon which to base his judgment. An elongated and rather weak looking beak is rarely if ever found on a plump or stocky bird, while a specimen with a powerful, hawk like beak is likely to be too heavily built all through to be symmetrical. The color of the beak is of importance only as it harmonizes with the general color of the fowl, or appeals to individual taste.

Legs and Toes.—In these again we have a good index of the general structure of a specimen. If one has a fowl which seems to him good in shape of body, but with poor legs—either poor in shape or not smooth, strong and well developed—he needs to reconsider his judgment on shape of body, and in most cases will find he was wrong. As to color of leg, it will be found that whenever a certain color is given the preference by fanciers, carelessness in selecting with reference to that color very soon results in a very shabby looking lot of fowls.

I have gone into the above points at more length than I had intended when the lessons for this year were first mapped out, because within a few weeks it has been very pointedly brought to my notice that a very great many beginners who are most interested in the "practical" aspects of mating, need to be admonished not to neglect appearances. So I have tried by reiteration in a little different form to give special emphasis to some general points which every breeder of thoroughbred fowls ought to give some consideration. By giving a little attention to these points a breeder will save himself disappointment in the coming seasons when he knows enough about the finer qualities of the varieties he breeds to want to select more closely with reference to them. The points I have indicated are points I think anyone can distinguish and appreciate. Giving them consideration simply means guarding against serious faults. A good many new breeders need to understand that while it would be not at all to their advantage to go to the extreme in fancy points, it is just as much to their disadvantage to neglect them altogether. Indeed, unless one gives reasonable attention to the looks of his fowls he loses half the satisfaction of producing good ones, though producing only for eggs and meat.

Mating White Varieties.

The impression is general among breeders not producing stock for competition and among beginners that white is easy to reproduce. This is true of the white commonly produced by such breeders, but not of such a pure silvery white as the fancier works for. The ordinary white fowl compares with a good white fowl about as a piece of unbleached muslin does with a piece that is thoroughly bleached and *white*.

The common color faults of white fowls are yellow distributed through the plumage, giving it a creamy appearance in all sections, and sometimes becoming very brassy looking on the backs of the males; and ticks or splotches of foreign color, as black or red occurring irregularly in the plumage. Very few fowls are absolutely free from these faults. Ticks or splotches are most apt to occur in the specimens with whitest plumage, while creaminess is correlative with the yellow legs, beak, and skin required in all the popular white varieties.

While the Standard calls for an absolutely white fowl, many of the best breeders think it better to allow a little creamy color throughout the plumage rather than take the lighter faded yellow skin and legs seen on most very white birds. So in mating his white fowls the beginner is wisest who does not try to get *white* regardless of other matters, but avoids pronounced brassiness and creaminess, and foreign color in the stiff feathers where it cannot be removed without disfiguring a bird.

In the white varieties not having yellow legs and skin creaminess and brassiness are not so prevalent, but — as would be expected — there is likely to be a great deal more ticking and blotches of the black, red, or brown.

Mating Black Varieties.

In black again we have a so-called solid color as difficult to produce to perfection as any of the color combinations. The black oftenest seen is a dull brownish black. The black desired is a jet black with a greenish sheen. The black oftenest obtained by fanciers trying to

get the required color is a jet black with purple barring. This comes from an excess of color, and results generally from too strong color matings. The mating of two jet black specimens with fine green sheen is apt to bring the objectionable purple bars. So the expert fancier breeding black fowls avoids mating the finest plumaged birds of either sex with equally fine colored specimens of the other sex. With a male perfect (approximately) in color he mates females that, without being pronouncedly brownish, show a tendency to that color. Similarly with his finest females he uses a male with a little less strength of color.

Fine specimens having the purple barring are used in breeding with birds very poor in color with black weak and showing quite brown and dull. They are also used with birds of correct color. In the first case only a small proportion of the progeny is likely to come good in color, for uniformity and soundness of color do not result quickly from such extreme matings. In the mating of a bird with an excess of color with one of standard color some very fine specimens are sometimes produced, though, naturally, a considerable part of the progeny shows the purple bars.

Mating Buff Varieties.

A solid golden buff fowl is one of the most beautiful in plumage, and the perfection of color in buff fowls is most difficult to obtain. From the most carefully selected matings a proportion of chicks come that as they grow up show white or black in wings and tails, or red across the shoulders and backs of males, uneven mottling of different shades of buff throughout the plumage, different shades of buff in different sections. The proportion of such chicks is often discouraging to the beginner, but by persistently mating from the best specimens he can procure or afford to buy, he in time can develop a line of buffs that will give him a very satisfactory proportion of birds as good as the best.

In mating buff fowls keep as near as possible to the shade of buff you are trying to get. Good buff being so very scarce—even yet—it follows that most matings will be of males a little dark with females a little light, or *vice versa*; but in making these necessary compensation matings keep as near the standard color as you can, and if you have fowls of both sexes of standard color, and in other respects suitable to mate together, by all means make such a mating if only of a single male and female.

In breeding for buff more perhaps than in working with any other surface color, undercolor is of great importance. In saying this I do not wish to be understood as suggesting a neglect of undercolor in other varieties, but I know of no other color in which surface faults may be overlooked safely and reliance placed on sound undercolor to work the defects out of the surface to the same extent as in buff. Get the best undercolor possible, a buff, but a little lighter in shade and duller than the surface color. In undercolor, though, take a bird that is almost white, if good in surface color, rather than one that has a bluish or slaty smudge or bar in the undercolor, for birds with such undercolor are apt to give you too much black in wings and tails, and often give a great deal of lacing and ticking of black in the surface color of their progeny.

In surface color a little white is less tolerable than a little black—appearing in mealiness in flights and tail feathers, but in undercolor black should not be tolerated.

Mating Red Varieties.

In general what has been said of mating buff varieties applies to reds, though the ideas of breeders of red varieties do not yet agree as do those of breeders of buffs, and therefore their methods of mating are not so generally alike, and the fact that black is admitted in the wings and tails, and to some extent in the hackle, makes the use of birds with smutty undercolor perhaps a little less risky than in breeding buff color. The tendency in the development of the reds, however, has been for the elimination of black and toward making it a solid colored bird. The R. I. Red standard in fact simply recognizes and permits markings which in the buff breeds were never treated as leniently in the Standard as they were in practice. It is because the tendency in Reds seems unmistakably toward uniform color and the final elimination of black, and because this tendency makes the breeders follow the methods of breeders of buff fowls that I have taken the liberty of classing red as a solid color, though it is not strictly so in fact.

Mating Barred Varieties.

In considering the mating of Barred varieties, we will take up the Barred Plymouth Rock as the representative of this color type known everywhere, and indeed the only one in which those studying these lessons are likely to be interested.

The Standard requires that the plumage of males and females shall be of the same uniform color throughout. The exact description of this color has caused no end of controversy. Some affirm that it is a black bar on a white ground, but looks blue. Others say the ground color is grayish or bluish white with the darker bars blue. Breeders agreeing on color often disagree about proper description of it. The amateur, however, need not puzzle himself about their differences on that point. On the things that trouble him most in the appearance of his fowls, the breeders are pretty well in agreement—though they differ again as to the best method of getting what they want.

The beauty of Barred Plymouth Rock color is in the character of the bars. They should be parallel—that is, straight across the feather, not breaking at the quill, and not crescentic in form, and they should be quite sharply defined. The ground color should be clean, and the dark bar should be free from greenish or brownish tinge.

Some of the faults indicated in the last paragraph are found in some degree in nearly all Barred Plymouth Rocks. It is only by using specimens as free as possible from them that a breeder succeeds in getting plumage on his fowls that makes them really attractive, and it is because beginners so seldom look sharply after these faults that the first few years of work with Barred Rocks so often results in striking deterioration from the quality of the original stock regardless of the system of mating used.

The Two Systems of Mating.

The average beginner—I might go further and say ninety-nine in every hundred persons who begin the breeding of Barred Plymouth Rocks accept off-hand the principle set forth by the advocates of mating standard male and female to produce standard colored progeny of both sexes. The advocates of single matings insist that that system should be followed because it is right in principle. So the beginner follows it—for a while.

Now because I went through all that, and spent a good deal of money finding out for myself that the other way was better, and because I know so many of the best breeders use double matings, and so few do not; in this lesson I am going to discuss the single mating system with the remark that if one wants to try it he should be very sure that the birds he begins with are line bred that way.

The Double Mating of Barred Rocks.

This system calls for two distinct lines of stock—one to produce standard males, the other to produce standard females. A breeder who wants to exhibit and sell Barred Rocks to a general trade must mate both ways. One who likes Barred Plymouth Rocks, and can keep only one mating, can breed either a cockerel or a pullet line and produce nice stock and have a stock that looks as well in his yards as anyone's—for be it remembered the specimens mated in the show room for exhibition are not, as a rule, mated anywhere else.

Very early in the history of the Barred Rock breeders were worried by the tendency of the females to run dark, and of the males from the same mating to run light in color. Finally someone (I believe it was judge H. B. May, of Natick, Mass.,) hit upon the plan of a special mating for each sex. The results were so satisfactory that the idea was gradually taken up and the plan followed so generally and systematically that the leading stocks of Barred Rocks in the country are now, with few exceptions, carefully line bred for many years with distinct male and female lines.

The special mating to produce males takes a male of standard or exhibition color and mates him with females of the male line, that is, females bred as he is bred. Such females are considerably darker than the females seen in the shows, but must be well and strongly barred. From this mating come males the color of the sire; females the color of the dam.

The special mating to produce females mates with exhibition females cockerels of the female line. These males are lighter colored than the females, sometimes very light in color, but always must be distinctly barred. Males from such matings follow, as a rule, the color of the sire; females the color of the dam.

The breeder of Barred Rocks who would follow this system of breeding should buy all his stock from one breeder, and have him make the matings. The common practice of beginners buying a pen or trio from one breeder, and a pen or trio from another breeder, and changing the males to avoid inbreeding is responsible for a great deal of unsatisfactory results in all varieties, but in none is the risk greater than in Barred Rocks. Until one knows his own stock and knows how it is bred, it is better to rely on the breeder of his original stock for the first mating, and, if possible, to get his advice and buy stock needed for future matings from him until one has reason to think he can go it alone.

Undercolor.

The Standard requires that the barring on the feathers of the Barred Rock extend the entire length of the feather, right down to the skin. The underbarring need not be as distinct as on the surface, but should be clearly discernible. Some advanced breeders get underbarring so strong that it makes a smutty surface, but the beginner errs oftener in the other direction.

Mating Light Brahmases.

In the Light Brahma, Light Brahma Bantam, and Columbian Wyandotte, we have a color combination, perhaps best described as white with black points—that is, the white greatly predominates in the surface color, the black appearing only in a few sections, i. e., in hackle, wings and tail.

In the hackle the black is in the form of a heavy black stripe in the middle of the feather.

In the tail the stiff main tail feathers should be solid black; the sickles and larger coverts black, while the lesser coverts are black edged with white. The coverts are the soft somewhat curling secondary feathers of the tail, larger next the main feathers, and gradually merging into the plumage of the back and saddle.

In the wings the largest primary or flight feathers are in the best specimens black with a narrow edge of white at the lower edge of the feather. The secondary feathers should have enough of the lower web of each white to make the folded wing white.

The undercolor should be white or bluish white, and it is desirable that sections that are white on the surface should be white or nearly white in undercolor except near their juncture with a color section containing black in surface color, where a darker undercolor is not objectionable.

The problem in mating for this color combination is to keep the surface colors in their allotted places as intense and as clean as possible. As in all color combinations, the tendency is for the colors to run together. While no double mating system such as is used for Barred Plymouth Rocks is employed, Light Brahma matings generally have to be compensation matings, a standard male with a female not so intense in black sections, and females very strong in color with males a trifle weak. Two birds that are both rather dark in undercolor, if mated together, generally give chicks with much splashing, mottling, and ticking of black in surfaces that should be white.

Mating Silver Penciled Varieties.

In all the varieties so far considered the male and female are as nearly identical in color and markings in every section as the art of the breeder can make them. We now take up a number of varieties in which the male and the female are not the same color: First, we consider the silver penciled varieties—the Dark Brahma and the Silver Penciled Wyandotte—which are practically the same in color.

The males are black, or black slightly frosted with white, in plumage of breast and body, white on the back and wing bows, white with black striping in hackle and saddle feathers, while the stiff wing and tail feathers are the same as in the Light Brahma, except that the wing coverts are black and make the black bar across the wing when folded. This gives us the "black-white" color combination.

The females are like the males in color only in the hackle. The prevailing color of the female is a light gray with distinct dark lines of penciling following the outlines of the feather, the several lines of penciling on each feather making a completely penciled surface. The main tail feathers are black, and the stiff feathers of the wing are black and a penciled gray instead of black and white, as in the wing of the male.

The difficulties in breeding this combination are to get clean colors and distinct penciling in all sections in the females, and to get good black breasts in the males, and get these from the same matings. One of the best of our breeders who breeds both these varieties gets his best results from well penciled females mated with males as near Standard color as possible, and known to be from well penciled hens. Such a male may have some "frosting" of white in the black of the breast and body, which is a fault in the exhibition pen, but not so much so in the breeding pen. The males with solid black breasts are apt to produce females that are too dark and not well laced.

The fault in quality of color most necessary to guard against is a brownish tinge in the females, and red or brown in the cape or back of the male.

Mating Golden Penciled Varieties.

In these two varieties with "Partridge" markings constitute one type of the black-red color combination; these are the Partridge Cochin and the Partridge Wyandotte, in which the markings are similar to those of the Dark Brahma and Silver Penciled Wyandotte.

The males of both varieties are red where the males of the silver penciled varieties are white. The females of the "Partridge" varieties have red or reddish brown plumage with darker brown penculings.

The rules for mating are the same. Some breeders use double matings, making two distinct lines as in double matings of Barred Plymouth Rocks. Whether the practice will become general, remains to be seen.

Mating Silver Laced Varieties.

There are three of these: the Silver Laced Wyandotte, the Silver Polish, and the Silver Sebright Bantam. Though not alike in all sections they have a general resemblance. The conspicuous difference between them and the type we have called the black-white type, is that in these varieties the plumage of the breast and body has the same markings in both males and females. The necks, backs, and tails of the males of the Wyandotte and Polish are not much different from those of the silver penciled varieties, but in the Bantam the markings are like the hen throughout.

We will consider only the Wyandotte in this lesson. Originally the Silver Laced Wyandotte had plumage with such a very wide lacing of black that the white centers were so small that it seemed more appropriate to consider the white as a mark on the black rather than the black a lacing around the white. Of late years, however, there has been a change to a more "open" center, making a different looking and very much handsomer fowl. What puzzles the breeder is to get these lacings uniform all over the female and in the laced sections of the male. To accomplish this the double mating system seems to be preferred by our most successful breeders, two distinct lines being bred as with the Barred Rock, though it can hardly be said that the lines are as well established as in the Rocks. The type of Silver Wyandotte color has changed so much that we must regard the ideas of breeders as in a transition stage, and that being the case I would rather advise a reader handling that variety to either find out what lines his stock has been bred on, and follow same lines, or supply himself with all the literature on mating the variety he can get, and after deciding what line he wants to follow in mating, begin to build the stock on that line, drawing for new blood as needed on some one breeder following the same line.

Mating Golden Laced Varieties.

Here we have the three varieties discussed above, each duplicated in its own breed with a variety having a golden or bay ground color of plumage instead of white, as in the Silvers. With the change of color, the principles and rules of mating are the same.

In popularity too, the Golden Wyandottes, Polish, and Sebright Bantams have relatively much the same positions as the Silvers. None of the laced varieties are as yet very extensively

bred. Like the penciled varieties described above, they have been too difficult for the average breeder, but as knowledge of breeding increases there is more and more disposition to take up the breeds that have been let alone because they were difficult, and these breeds become more and more popular.

Mating Brown Leghorns.

The Brown Leghorn male and the Partridge Cochin male are very like in color, but the females are quite different. The Partridge Cochin female is required to be uniform in color throughout. The Brown Leghorn female has a yellow neck with black stripe, a light brown back so very finely penciled as to produce an effect quite different from the heavy distinct penciling of the Cochin and Wyandotte. The breast is salmon colored, the body a light brown, the tail black with coverts penciled as is the plumage of the back, the wings a combination of slaty brown and light brown disposed as are the black and white in the wing of the Light Brahma.

To produce males and females so different, the double mating system is generally used, the exhibition males being bred from exhibition males mated with females of the same line of breeding. Such females are, as a rule, much too dark for exhibition, and not nearly as handsome as the exhibition females. The exhibition females are produced from exhibition females mated to males that are not merely of the same line of breeding, but known to be the sons of exhibition females of the highest merit.

The exhibition male has, or should have, (he does not always) his hackle and saddle well striped with black, but no striping at all is wanted in the saddle of the pullet breeding male, and provided a stripe is present in his hackle, the breeder is not disposed to be overparticular about the kind of stripe. These pullet breeding males are much lighter in color, a light orange where the others are red. They are handsome birds, but will not often compare for depth and brilliancy of color with the males of the exhibition type.



The Literature of Mating Fowls.

I have given quite briefly, statements about color matings of fowls most commonly bred. What has been given, while most elementary in scope, will help a good many breeders, will keep them from getting too far out of the way in their breeding operations. A full discussion of the mating of any single variety will easily take a long article. As a matter of fact there are few, if any, special articles that are exhaustive, complete, and leaving nothing unsaid. So to get at all there is known about the breed or variety in which he is interested, one has to systematically collect articles, booklets, and books in which it is treated. These vary greatly in their character. Some give minute descriptions of fowls point by point, some are largely historical, some are devoted almost entirely to mating, some combine all these features. Sometimes one writer in an article that is on the whole very unsatisfactory brings out valuable points not noticed by the writer of a better and much more complete article.

Thus we must gather up our information little by little, remembering all the time that as we grow in our knowledge of a breed we can again and again go back to the articles we have read, and in the light of our added knowledge discover in them information we had not found at any previous reading. Because this is so it is good for every breeder to collect as much as he can of the literature pertaining to his breed, and frequently take a spare hour or two to review and think it over.

With regard to the purchase of books, which in cases where the literature of a breed or variety is unusually large, might mean an outlay of several dollars, if one is going to breed on a considerable scale with the idea of selling stock, it is worth his while to get everything he can on his subject, even though some of the books contain comparatively little that seems of value to him, and therefore not worth their price considered as books. That, however, is not the way to look at it. If I buy a book for a dollar that is compared with some other book treating on the subject worth not more than ten cents, still if it gives me one item of useful information I had not before, it is worth the money.

LESSON V.

Hatching Chicks With Hens.

WITHOUT entering here into a discussion of the relative merits and advantages of artificial and natural systems of incubation, I want to state first of all that many of those who do not get satisfactory results by natural methods, and do get much better results by artificial methods would have had much better results than they did by natural methods if they had been as careful to make conditions right for the hens to do their best, as they try to be with the incubators.

The cost of an incubator, the value of the eggs required to fill it, and the fact that anything going wrong with the machine may mean a total loss of the eggs put into the machine, and of three weeks time, makes operators of incubators appreciate the importance of doing all in their power to make conditions for a good hatch. But the fact that a hen left entirely to herself may bring off a good hatch, and the fact that hens can be put off with very indifferent hatching accommodations, leads many poultry keepers to do their hatching with hens under conditions not favorable to good hatching.

“Whatever is worth doing is worth doing well.” If one is going to hatch with hens he should, as far as possible, give the hens a chance. He should go beyond this, and seek to avoid all things which operate against good hatching with hens.

Where to Set the Hens.

Sitting Hens in Regular Poultry Houses.—The quarters for sitting hens should be comfortable and convenient to work in. If possible such a house or pen as is used for laying and breeding stock should be used for the sitting hens. About the only changes desirable are the removal of unnecessary fixtures, and, if the place is very brightly lighted, some darkening of the windows.

The floor should be cleaned, all litter and manure removed, and, if the floor is of earth, it should be forked over, to give as clean a surface as possible.

While access to a yard is not absolutely necessary, I consider it important; for my experience has been that, on the whole, hatches were better, chickens more thrifty, and hens kept in better condition when they were able to get outdoors every time they came off the nest.

If nests are placed only on the floor, ranged around the walls, a pen will accommodate about the same number of sitters as it will of layers. It can be used for a few more than it is advisable to put in it for laying, but to keep down the work of caring for the sitters it is best not to crowd them too much.

Making Special Quarters for Sitting Hens.—If no quarters like those used for other stock can be taken for hatching purposes, and some other arrangement has to be made, the first consideration is to see that it provides freedom from disturbance, and that it is not a place in which

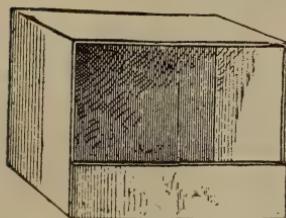
it will be inconvenient to care for the hens. Too many of the places improvised for sitting hens are faulty in these particulars, and as a result the hens may get too much attention from others and too little from the keeper.

There are often rooms, or sheds, or corners in large buildings that can be partitioned off that, as far as indoor accommodations go, are just as good as quarters in a poultry house, but often such quarters do not admit of letting the hens out doors during incubation, and in case it is possible to make arrangements that will give the hens a daily outing that ought by all means to be done.

It is also important in taking a place sometimes used for other purposes for sitting hens, not to continue its use for other purposes if that would at all interfere with the proper treatment of the hens while incubating.

Individual Compartments for Sitting Hens.—My experience in using a separate small coop for each sitter never went beyond the experimental stage, because I never had average hatches that way that made it seem worth while to continue any of the numerous arrangements of this kind that I have tried. The hens confined to nests and to very small runs when off the nest have always been restless, and good hatches under such conditions have, with me, been rare.

The Unit of Nest Boxes for Sitting Hens.



Single Nest Box for Sitting Hen. will answer, but such low nests are not as convenient for handling the hens. For small hens 12×12 on the ground will do, but I would not advise anyone cutting up lumber for nest boxes to make them smaller than $12 \times 14 \times 14$ in. Make the small nests only in case you can use a few of them and have odds and ends of lumber that will make them, but would not make the larger size. For large hens make nests up to $16 \times 16 \times 16$ in size, that size making a roomy nest for the largest Brahma hens. Note that very much of the trouble with large hens breaking eggs is due to their not having room to turn in the nest.

This nest may be made either with or without a bottom. For single nests it is advisable to have a bottom, because the nest is so light that it is easily moved out of position. In that case if the nest is in the box the eggs are not disturbed, but if the nest box is simply a cover over a nest built on the ground the eggs may be injured. Where double or triple nests are used, the weight and the binding of the earth produced by shaping a nest in it when the box is in position, hold the nest box so firmly that it is not easily displaced, and there is no need of a bottom unless it is thought advisable to have nest boxes that can be moved with the hens in them if desired.

The narrow strip at the bottom of the front of the box should be 3 to 4 in. wide according to the height of the box.

With nest boxes of this construction a hen cannot jump down on the eggs as she may if set in a barrel or half barrel, or box open at the top, while it is very much easier to inspect the nest when the hen is on by simply putting a hand under the hen and lifting her body enough to let you see the eggs. She is disturbed but little by this, when she would be much annoyed by being lifted off to let the attendant see the eggs from above.

The Beginning of a System of Nest Boxes.

In the double nest box shown in the illustration on the next page, we have the beginning of a system of nests based on the unit just described. This box also has a movable front which can be used to confine the hens to the nests. I have sometimes made nests in sets of three or four, but for my own use prefer to have them in pairs, because more easily handled and generally fitting better into spaces available.

Placing Nests for Sitters in Tiers.

When it is desired to set many more hens in a room than can be accommodated with nests on the floor, poultrymen sometimes build the nests in tiers, two, three, or more tiers high, and instead of a loose front, like that shown in the illustration of the double nest, make a slat (lath) front, hinged to the strip at the bottom of the front of the nest, and either supported by a bracket below or by a string or hook from above, so that when open it makes a shelf for hens to go on when leaving and entering the nest.

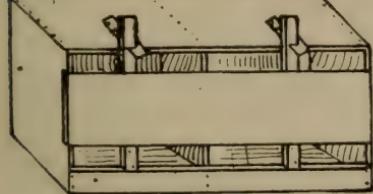
This arrangement of nests may be made with the nests built in large sections, each the full height of the combined tiers, or with each small section of two, three, or four nests independent of the others and combining like the sections in a sectional book case. When constructed in this way the nests must, of course, have wooden bottoms.

How to Make a Nest.

In a Nest Box With a Bottom the nest may be made of earth covered with fine straw or hay, or of straw or hay alone. The nest on a base of earth is usually more satisfactory if properly shaped; if not properly shaped at the start, hens are more likely to break eggs and crush chicks in it than in a nest of all hay or straw, because the latter will improve in shape as a result of the movements of the hen, while the earth base formed once, there is no alteration in its form.

To make the base of earth for the nest: Take a shovelful of fine loam, not wet, but moist; put it in the nest box, and with the hand make a hollow nest, working the earth up to the

corners and around the sides, but leaving the bottom of the nest, while a little hollow, not so much so that eggs will roll to the middle. Now, after having worked the earth quite firm and smooth with the palm of the hand; take a good handful of soft hay or straw — not too long—say six or eight inches long, and make the nest of it, distributing it evenly over the earth base, and working with the hand until you have it smooth and well pressed down. It does not take as long to do this as to tell about it. If it is not well done the hen will undertake to do it herself with the eggs in the nest, and the result is apt to be hard on the eggs and also on the temper of the keeper.



Double Nest Box for Sitters.

a—Wooden latch to hold front in place.

When a Nest is Made Without Earth in the box, more nest material is used; it must be much more carefully shaped, and it does not hold the shape given it as well—which is or is not a fault according as the work was well or badly done.

To Make a Nest on an Earth Floor the box is placed in position and the earth shaped just as if earth had been put into the box. All lumps of earth must be broken fine, and all stones or large gravel must be removed. Then the nesting material must be put in as described above.

A Few Observations on Nest Materials.—Hay and straw, cut short, do not make good nests, because the material works about, and does not retain the shape given it.

Excelsior makes a very good nesting material.

Waste tobacco leaves and stems make good nest material, whether used with other material to keep lice out, or used alone.

Nests of earth without other material, I have never found satisfactory. True, hens that steal their nests and make such nests in them sometimes do well, but oftener they break eggs in them, just as hens do in any poorly formed nest, and a good proportion of the stolen nests are poorly formed. A hen by no means always makes a good nest, and seeing that the nest is a good one is one way in which a poultryman can improve on nature.

Selection of Sitting Hens.

Because not all hens that have the disposition to incubate make good sitters, there must be a judicious selection of the hens to be used for hatching. Otherwise, good hatches will not be as frequent as they should — to say nothing of the difference in the work of handling good and poor sitters.

While no rule will apply universally, I think it will be found to be the general rule that rather small hens make the best sitters, but large hens the best mothers. The superiority of the small hen as a sitter is not due altogether to her light weight, and the greater danger of a large hen breaking eggs — particularly when, as is too often the case, the large hen is set in a nest none too large for a small one. The great superiority of the small hen in incubation is that she is, as a rule, more warm blooded, generates heat more rapidly. When it comes to brooding the chicks, her small size and short plumage handicap her, and the chicks quickly reach such a stage of growth that she is too small a brooder for the chicks she hatched, and unless the weather is very mild her chicks cease to thrive.

The small hen often has the objectionable trait of being wild and nervous, not docile and easily handled as a sitter should be. This fault can generally be overcome by judicious handling. While I do not think it is as necessary as some authorities on poultry keeping say, to "be sure your hen wants to sit" before you give her the eggs you want her to incubate, I do consider it very necessary to be sure your hen will allow herself to be handled before you set her. Hens that are unmanageable provoke tempers that are out of place among sitting hens, and the result is likely to be unsatisfactory. Be sure then, that the broody hen will allow herself to be handled, by dusk or dark, if not by daylight.

Temperature of Hens.—That the temperatures of hens vary, and that hens that seem very hot, generally make the best hatches, is, I believe, agreed among poultry keepers who have closely observed conditions of hatching by natural methods. The difference in temperatures is apparent to the touch if hens are so handled that the palm of the hand comes in contact with the body of the hen, which is generally partially stripped of feathers when she begins to incubate. If, in handling several hens, you find one that seems to have perceptibly less heat than the others, do not use her; or, if you use her, watch her eggs and chicks and you will nearly always find her a poor hatcher and a poor mother. Some poultrymen who hatch large numbers of chicks with hens, overcome the effect of using these low temperature hens for sitters by changing them from nest to nest, so that a low temperature hen will not be likely to be on the same eggs for more than a day at a time, and perhaps not for more than one day during the entire period of incubation. Under ordinary circumstances, however, I think it is better to reject low temperature hens when selecting sitters, for with no more hens sitting at one time than on the ordinary plant where hatching is by natural methods, it is an advantage to have the hens keep the same nests.

When and How to Set Hens.

When a hen is not to sit in the nest she has been laying in, it is best that she should be moved after dark. It is not in all cases necessary to do so, but it will be found that a much larger proportion of the hens will settle down quietly in their new quarters if moved after dark, and their nests kept darkened until they are let out to feed just before dark the next evening.

If there are many hens to be moved, and they have to be moved some distance, it is a good idea to have a coop to move them in, but if only a few hens at a time, and no great distance, take one hen under each arm and carry them. Whether carried separately by hand or in coops, the hens should be handled gently and not excited.

A novice in handling sitting hens may find it better to keep them on nest eggs for a few days while breaking them and himself in. After one is sure of his steps it saves time to have the eggs that are to be incubated in the nests when the hens are moved to them.

Except with the quietest hens it is necessary to close the nests after the hens are put on them, and advisable to darken them. When I use a single open nest I put a wide board in front of it. For darkening nests, like that in the second illustration, we use an old grain sack. With the nests darkened, and the place quiet, the hens will nearly always settle down to business.

About Eggs For Hatching.

The eggs intended to be incubated should be kept in a dry place at a rather cool temperature, say 40 to 50 degrees.

It is not advisable to keep them longer than two weeks before being incubated, and the fresher they are when set the better chances of a good hatch and strong chicks.

It is not necessary to turn eggs while kept in this way, nor does the position of the egg, whether on the side or on an end make any difference.

Only well formed eggs with good strong shells should be set. A great deal of the breakage of eggs of which people using hens for hatching complain is of thin shelled and imperfect eggs. There is less breakage of such eggs in incubators than under hens, but it is doubtful whether there is any real gain in hatching them.

When eggs are bought outside and delivered by rail or wagon they should be rested for a day before being placed under hens. This is to allow the contents of the egg, sometimes much shaken up in transit, to regain their normal condition.

When setting such eggs it is a good plan to divide each sitting, and under each hen used place some of the boughten and some of one's own eggs. This gives a better opportunity to determine whether a poor hatch is due to poor eggs or to some cause for which the party from whom they were purchased is not in any way responsible.

Number of Eggs to a Hen.—This must depend on the season and on the size of the hen. The usual number for an average sized hen in the spring is thirteen. The same hen set in winter should not be given more than eleven. After the middle of May she would generally take care of fifteen average eggs.

If one is in any doubt as to how many eggs he ought to give a hen he should err on the safe side and give a number he is sure is not too large, for when too many eggs are given a hen every egg in the lot is likely to be somewhat chilled at some period of incubation.

Food For Sitting Hens.

Nothing could be simpler and easier than the feeding of sitting hens. All they need is whole corn and water. Though I have tried other rations the hens have never seemed to me either to keep in as good condition or to hatch as well as when fed on corn alone. The condition of the hen is not at this time normal. She needs food that will generate in her body heat to be transmitted to her eggs, and whole corn seems to be the perfect food for the sitting hen. She can eat a crop full in a few minutes. Being inactive, she digests it slowly, can get along on one meal a day, and I have had a good many hens that would leave the nest to feed only every other day, yet keep in good condition and make good hatches.

Care of Sitting Hens.

Assuming that the hens when set were confined to the nests, and they should be unless it is certain that they will not leave them, (some hens are so quiet that there is practically no doubt that they can be set anywhere, and from the first be trusted to come off to feed and go right back of their own accord), they should have an opportunity to leave the nest within twenty-four hours after being set, and if they do not come off of their own accord should be taken off, for if they do not leave the nest and void their excrement now, they are almost certain to foul the nests before the corresponding time on the following day, and during the first days of incubation the change of conditions and food often produce a disturbance of the bowels, and for awhile some hens will be loose and unable to retain the excrement as long as they will later. Hence, even if a hen is not hungry, and eats little or nothing, it is important to have her off the nest daily at first.

Hens that are handled without any trouble may be let off the nests at any time convenient for the attendant. With hens that are inclined to be shy, the easiest way to break them to return promptly to the nest in a strange place is to let them off just long enough before dark to give them time to feed. They will often return to the nest quietly at this time, when if let off early in the day they would make a great fuss, and if handled roughly give the business up altogether. At dusk hens that do not go back of their own accord are more easily caught, and settle down quietly when returned to the nest.

Having returned to her nest once of her own accord, a hen may, as a rule, be allowed to leave it at any time convenient for the attendant, and unless there is something wrong with the hen or the nest, will generally go back within fifteen or twenty minutes, which is about as long as it is safe to have the eggs uncovered in cold or very cool weather. On bright warm days hens may remain off the nest half an hour to an hour without the eggs being any the worse for it. Indeed, the general rule is that the colder blooded hens stick closest to the nests, while the hot blooded ones give so much heat to their eggs that the nest gets uncomfortably warm, and they leave it for their own comfort, and instinct seems to prompt them to let their eggs cool longer than the cold blooded hen does.

When Many Sitters are in the Same Room it might cause trouble to release them all at once, especially if they came from different flocks. There are several ways of keeping things working smoothly.

If the hens were all set at the same time, and all, or any considerable part of them, are so shy that it is advisable to let them off late in the day, the attendant can watch them while off, and interfere if they go to fighting. If he does not wish to watch them daily he can, within a few days, arrange to let them off at different times in pairs or small squads, leaving the more troublesome ones to the last.

If, as is the case on most small plants, the hens set in a pen are set a few at a time, they are broken to return to the nest in the order in which they are set, and when new hens are set the others can be released at intervals earlier in the day.

On a larger scale of operations, if several rooms or pens are required for sitters, they can be prepared at the same time, a few hens set in each, then a few more, and so on until filled. This admits of gradually breaking in a large number of sitters to the desired routine without having to watch them when off the nests. Thus it is possible to establish a routine of releasing sitters which will enable one to do all the work of caring for them as he goes about his other work, yet take so little time for it that he never feels it as a burden — in fact, hardly notices it.

The routine just described will apply when up to twenty or twenty-five hens are sitting in the same place, but with larger numbers together, as there often are when nests are several tiers high, it becomes necessary to let many hens off at the same time, watch them to some extent while off, and return them to the nests after a sufficient time off has been given them.

Importance of Confining Hens to Nests.

I have always had better hatches, on the whole, when I kept nests closed except when the hens were off for food, etc. By doing so, one is sure that no nest is uncovered too long, and no serious interference of hens going on without his knowledge. Making this the rule insures against the most common causes of spoiled eggs. It is one of the little things that it pays to do, and the rule should be broken only in emergencies.

Keeping Sitting Hens' Quarters Clean.

General Cleanliness.—The dung of the sitting hen has a peculiarly strong and offensive odor, hence the importance of removing it daily. If it is not removed promptly from a pen in which there are many hens sitting the place soon gets very dirty. When hens are set in tiers, many in a small room, some poultry keepers as they watch them remove the dung, which is voided in large lumps, at once. If they did not do this the floor would soon be filthy, though cleaned daily.

Keeping the Nests Clean.—Absolute cleanliness in the nests is a condition of good hatching. If a nest is fouled, or if eggs are broken in it, it should be cleaned, the eggs washed in luke-warm water, the soiled nest material removed and the nest made new as soon as possible. Generally it will do no great harm if a nest goes for twenty-four hours uncleaned, but it should not go longer. There is some excuse for that much delay because it is not advisable to disturb the hens to inspect the nests. The inspection of nests should be made as the hens come off to feed. If the nest is in very bad condition it should be cleaned up at once. If not very bad note should be made of it, and all nests which need cleaning cleaned as soon as the attendant can conveniently do so.

Treating Nests and Hens for Lice.

Insecticides.—Tobacco leaves and stems, as noted in a preceding paragraph, are often used to keep lice away from sitting hens. When these are not used the nest should be liberally sprinkled with a good insect powder when made. Then a few days later the hen may be lifted from the nest in the evening and well dusted with insect powder. Another dusting of the hen about the middle of the hatch, and a third just before the eggs begin to pip will generally insure chicks freedom from lice when they hatch, and make it unnecessary to treat them for lice in the nests.

The Dust Bath.—When the earth of the floor of the place where the hens are set is clean and fine and dry enough that affords them a suitable place for wallowing, and hens that make liberal use of it will keep in much better condition than those that go back to the nest quickly after eating their fill. Wallowing gives them vigorous exercise, and also keeps the feathers clean. When there is a yard accessible, and the ground dry enough, hens will by preference go out in the sun to wallow, but this is too uncertain to rely upon.

Testing the Eggs.

It is always best to test eggs as soon as they have incubated long enough to show development, and remove all infertile eggs and all showing dead germs or a general breaking up of the liquid contents of the egg. It is such eggs that are most likely to break, and when they do break make the worst mess of the nest.

Egg testers are sold by all dealers in poultry supplies. One of the most common forms is a metal chimney to go on an ordinary lamp. One side of the chimney at the point opposite the flame of the lamp, is cut out and fitted with a piece of heavy felt in which is an oval hole of such dimensions that when an egg is held before it, the light shines through the egg, and whatever developments are made inside the egg can be seen.

A home made tester may be made of a box of such size as to contain a common hand lamp. The accompanying illustration shows how such a tester may be made. White shelled eggs

may be tested at the fourth or fifth day. Dark shelled eggs can sometimes be tested at the fifth day, but when the shells are thick and strong, as well as dark, it is as well to let testing go until the seventh day.

The most pronounced indications of fertility and beginning development of the chick are a clearly defined air space at the large end of the egg, (the egg should be tested large end up), and a cloudy appearance, densest in the upper part of the egg.

An absolutely clear egg is either an infertile egg or one in which the germ did not develop far enough for its death to immediately cause decomposition to begin about it.

An infertile egg will not decompose during the period of incubation, but would be clear if allowed at the end of three weeks to remain under the hen the full period.

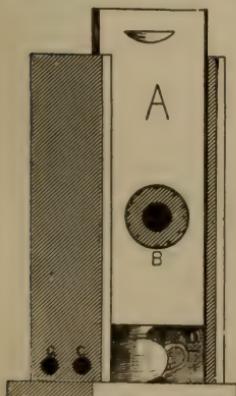
Heavy red lines or clots in the egg indicate dead germs. In a white egg a spider like red spot is often seen at the first test. This is the beginning of the development of the arterial system, and the egg showing it is all right.

When the air space, as seen through the tester, is not permanently defined, but the line between it and the fluids of the egg moves as the egg is turned about, the germ is dead, and the egg is decomposing.

The various conditions described above are not always unmistakably plain. Practice is required before one becomes expert in distinguishing them. In all cases where there is doubt, mark the egg and leave it for the next test, which should be made about the end of the second week. At that time the air space should show very plain, while all below it is dark.

Chilled Eggs.

If the instructions given in this lesson in regard to keeping nests closed are followed, there will be chilled eggs only in case of a hen becoming sick, or dying on the nest, or refusing to



Home Made Egg Tester.

sit. Such cases do occur, but the most common cause of chilled eggs is two hens taking the same nest, and leaving a nest uncovered. In freezing weather an hour is about the limit of time that eggs under ordinary conditions can be uncovered and still hatch. In warm weather they may be uncovered for several hours, or even all day without injury.

When the Chicks are Hatching.

After the eggs begin to pip, hens should not be disturbed more than is necessary. It is quite necessary, however, to look under the hens occasionally to see that everything is right. Some hens become very nervous at this time, move about and break the eggs. Such hens should be removed if possible and quieter hens that have eggs not far advanced exchanged for them. By shifting hens in this way when necessary, much of the loss common at this stage is saved.

It is at this time that a badly formed nest causes most trouble. If the nest is too dishing, the eggs tend to roll to the center, and crush in the shells of picked eggs, and often crush chicks as soon as out of the shell.

There are also some hens that will kill their chicks as hatched. One must watch for these, exchange them for others, and, of course, take them out of the sitters' pens as soon as their services can be dispensed with.

If, as sometimes happens, a part of the eggs in each nest hatch a day or so ahead of the others, it is a good plan to give some of the hens the chicks, and others the eggs yet to hatch. This gives much better chance of good chicks from the last eggs.

As a general rule, eggs that have not hatched by the morning of the twenty-second day, will not, even if they do hatch after that, produce chicks worth keeping.

Many people consider it an indication of exceptional vitality to have chicks come out in nineteen days, but I think most close observers will agree that the chick that takes twenty to twenty-one days to develop makes the best chick.

Helping Chicks Out of the Shell.

As a rule, it is best to let chicks get out by themselves. The chick that needs help is not often good enough to make it worth while to fuss with it.



LESSON VI.

Rearing Chicks With Hens.

BEFORE discussing the care of chicks with hens, we must consider the question of coops for hens with chicks. As we found in the last lesson that the necessary appliances for hatching chicks with hens were very few, simple, and inexpensive, and that the point of most importance was to provide quarters where the hens and nests would be as free as possible from all kinds of interference, and at the same time the place be convenient for the attendant; so in rearing chicks with hens we find that the appliances essential when conditions are ideal are simple, and that a variety of makeshifts, costing practically nothing, are used by poultrymen. As special conditions have to be considered, we have to give more attention to providing appliances to meet those conditions, yet in no case need these appliances be such that a man handy with tools could not make them for himself with little expense for material.

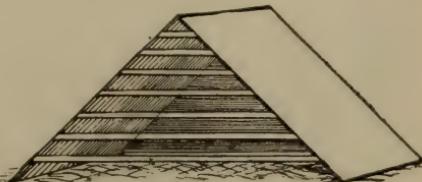
The primitive style of chicken coop was probably an old barrel lying on its side on the ground, with stakes driven into the ground across the open end, to confine the hen while giving the chicks liberty. A wide board closed the end of the barrel at night, or at any time it was desired to confine the chicks; this board being simply set in position and held there by a stone, brick, or block of wood. Barrels are often so used still.

An improvement on this form of quickly improvised coop was the box turned over on one side, with slats nailed across the open front. Should be not less than 12 inches wide; 14 or 16 inches is better. Length of sides about 3 ft. With boxes of good size, and fairly substantial construction, such an arrangement is still a good one where there are few enemies to molest the chicks, and they can have good range. The principal objection to it is that the hen is rather closely confined.

Of coops made for the purpose, the simplest is the common A shaped coop illustrated above. I do not recommend it except as an emergency coop. It can be quickly and easily made, and almost any old material will work into it, so if a coop is needed in a great hurry this will do.

A better form of this style coop is the A shaped coop with pen and movable shelter board shown in the accompanying cut.

This coop may be made either with or without floor. If to be used on heavy soil that holds the water after a rain, it should have a floor. If used on land that drains quickly, no floor is needed. Many people use and like these A shaped coops. It has always seemed to me that must be because they were used to them, and had not tried the other style. I might use such coops temporarily, but for a regular thing I prefer a box coop in its general makeup resembling the coop shown below with knock down pen.



Common A Shaped Coop.

Should be not less than 12 inches wide; 14 or 16 inches is better. Length of sides about 3 ft.

Advantage of Box Style Coops.

One advantage of this style of coop is that the entire floor space in the coop, and ground space in the pen, are available for the hen as well as for the chicks. In the Δ shaped coop



Another Δ Shaped Coop.

Sides of roof 22 x 28 inches.

the hen can stand upright only in the middle of the coop. This gives her actually much less room than she appears to have, and this close confinement in coops is one of the reasons why hens sometimes do not do well with chicks. We must give the hen a chance.

A second advantage of the box coop is that it is more easily cleaned. I used them for years in a dry climate, with the top nailed fast, cleaning the coop

by tipping first backward, then sideways toward the door, then forward, the droppings rolling out at the door. For climates where the floor gets damp, and the droppings adhesive, the top should be hinged, thus making it easy to get at the inside of the coop to clean. Besides, the angles at the floor being right angles instead of acute angles, as in the other style of coops, the corners are much easier to keep clean in case of the coop with a floor, and this box coop makes a serviceable coop for all seasons.

To go into all the details of coop construction in this lesson would be out of the question. We must have a special lesson on that subject next winter at the time when coops should be made ready for the coming season. I give here only enough about coops to give those studying these lessons a fair idea of them, and wish to impress on them as having special bearing on their success in rearing chicks with hens that the structure of the coops should combine these two features:

- (1). *Comfort of both hen and chicks.*
- (2). *Convenience of the attendant.*

Coop Pens for Hens and Chicks.

The illustrations so far show pens which confine the hen, but give the chicks full liberty. This is the best way to handle them if it can be done.

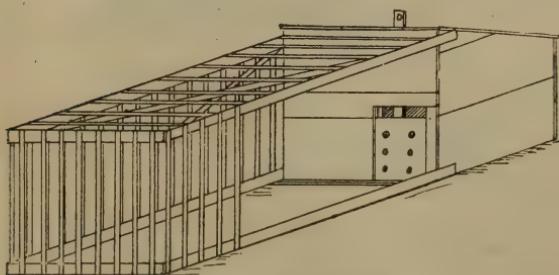
It cannot be done, however, where enemies of chicks are so numerous that they would

destroy many of the chicks if given liberty. Poultry keepers living in towns have especially to guard against the maraudings of cats. Against these the best protection is wire covered pens. The illustration on next page shows such a pen used with a box coop of the same width.

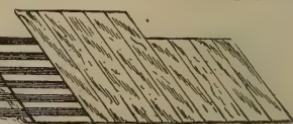
This pen is a little more easily handled than that I use, which is wider, mine being 6 x 12 ft. on the ground, where this is 2 x 12 ft. I prefer the larger ones as giving the chicks more room, and not requiring to be moved so often.

This coop is 22 x 24 inches, outside measure on the ground, 24 inches high in front, and 16 inches in the rear. When made of these dimensions 10 inch boards cut with practically no waste. The latter pen is 4 ft. long, 2 ft. wide, 2 ft. high. Top and bottom rails are of 1 inch stuff, 2 inches wide.

Now just a word about the use of such coops to protect the small chicks. They are more expensive, and it is more trouble to handle chicks this way than in the other coops with the



Box Coop With Knock Down Pen.



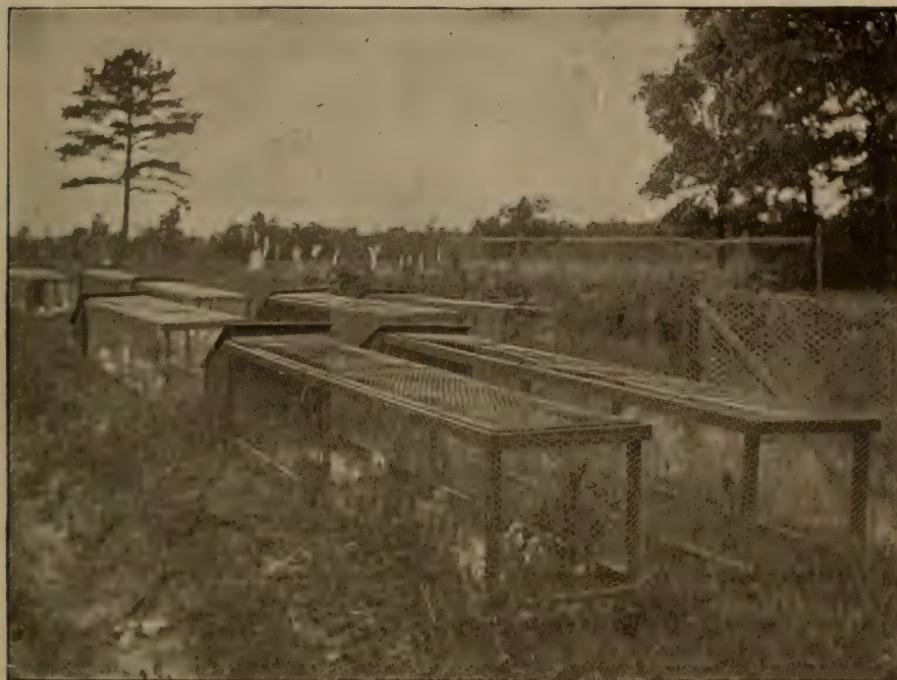
Coop Shown in Last Illustration with Pen 4 ft. Long and Movable Shelter Board.

chicks at liberty, but unless you are sure that losses from cats, hawks, etc., with the chicks at liberty will be very light, it pays to use safe coops. They have to be used only for a short time, and there is no use hatching chicks unless you take care of them after they are hatched.

Why Coop Hens and Chicks?

This is the question which has suggested itself to many readers. They may see the advisability of confining hens and chicks to protect the chicks while small, but do not so readily see the need of confining the hen while the chicks run at large. In a state of nature the hen runs with the chicks. Yes, but in growing chicks we have to average very much better than nature, both as to quality and quantity produced.

Hens have advantages as mothers. These we need not here consider. They also have their disadvantages. It is in guarding against losses from these that those who succeed well in growing chicks by natural methods excel. All hens are not alike in their habits with chicks. Some can be allowed full liberty; others cannot. You cannot know in advance which to trust.



Cat and Hawk Proof Coop Pens.

Dimensions of these coop pens are, — length 12 ft.; height 2 ft.; width 2 ft. They are made of lath, and covered with 1-inch mesh wire netting.

Hence you must devise a system of handling them, and impose such restraints on all that you are sure that avoidable losses are reduced to the minimum.

The faults of some hens as mothers are:—

(1). *Too great activity and restlessness, never still themselves, they wear the chicks out.*

I have seen fine broods of a dozen or more chicks reduced to two or three in less than two days, in this way, when, had the hen been restrained, not a chick need have been lost. Confine the hen, and, as a rule, she soon learns to be contented in her coop, if it is a suitable coop, and, if her wants are supplied, gives her chickens a great deal more brooding than if allowed to run with them.

(2). *Weaning the chicks too soon.*

Many hens would leave their chicks at two to three weeks old, if allowed to do so. Some will brood chicks while laying, but many will not, and as a well fed hen is likely to begin laying within ten to twenty days after hatching her chicks, many chicks will be forsaken while still in need of a mother, if the hens could leave them at will.

These are the general faults against which cooping is an insurance. The other special faults will be considered briefly under the next heading.

Selecting Hens for Mothers.

A hen that makes a good sitter does not always make a good mother. Some hens that sit very quietly become very fussy with a brood of chicks, are a constant aggravation to the keeper, and frequently injure chicks. The ideal mother is the hen that has made a good hatch, and, that on removal from the nest with chicks, settles down quietly in the quarters assigned her. If she tramps about and seems to move without regard to the chicks, change for another hen if possible. If she is vicious, don't use her for another unless you have to. The hen that fights for her chicks, with or without provocation, will do in fiction, but in practice she harms more than she helps them. For the sake of the chicks as well as for the sake of the attendant, only docile hens should be used as mothers.

Taking Chicks from the Nest.

Chicks should be removed from the nest about twenty-four hours after the first chicks in it hatched. If hatching has been uneven, there may be some chicks not ready to leave the nest then. If so, they may be put under other hens, or if that is not practicable, remove to a warm place, and keep them wrapped in flannel or cotton until well dried and up on their feet.

By the time the first hatched chicks (which are generally the strongest), are a day old they want to get out from under the hen and move about a little, and may make her so restless that if the nest is open she will leave it with such chicks as can follow her, and if closed so that she cannot get out, may scratch around in it and do a good deal of damage.

Except in warm bright settled weather, it is not, as a rule, advisable to take chicks at this age direct from the nests to outdoor coops. Though they want to move about a little, and soon eat some, for the first few days warmth and quiet are of greatest importance. To secure these, have boxes with open tops protected by slats or wire netting, into which the broods can be put for a few days, and kept indoors.

The hen and chicks can be fed and watered in these, and can move about a little, but must keep quite quiet, and in case a hen is not disposed to brood her chicks the greater part of the time, she can be "persuaded" to do so by throwing a bag over the top of the box, making it dark. Chicks kept close and warm and quiet this way for a few days go to the outdoor coops strong and lively.

In bad weather they may be kept in such boxes a little longer, but never more than four or five days, or they fret at confinement and do not thrive.

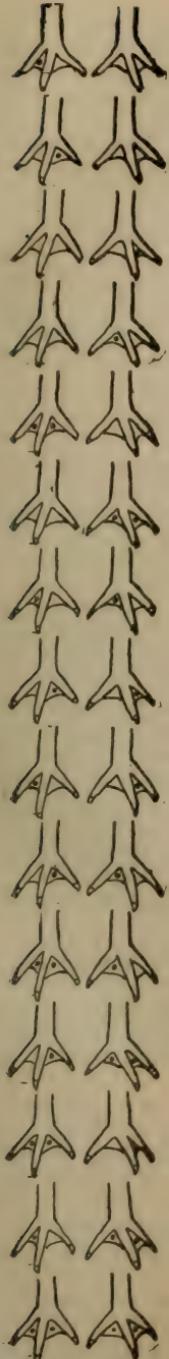
Before putting chicks into the box, put a sprinkling of chaff, hay, leaves, or finely cut hay or straw into it. Use just enough to cover the bottom. Too much will often make trouble, the hen scratching in it and burying some of her chicks with it.

Marking the Chicks.

If the chicks are to be punch marked in the feet to identify them, it should be done as they are taken from the nest. For this purpose use a small size spring punch made for marking chicks, and sold by all supply houses and many poultry journals. (We advertise one in this paper).

If chicks are marked at this age, the operation gives as little pain as possible. The cut bleeds but little, sometimes not at all, and as the chicks remain under the hens most of the time for a day or two, there is less trouble with chicks, attracted by the blood on feet that bleed, picking each other to pieces.

In making the punch mark, mark well into the web, but not so far as to injure the bones of the foot.



Method of Punch Marking Chicks.

The usual practice is to mark chicks according to the mating from which they came. Sometimes, however, each brood is given its special mark. As the accompanying cut shows, it is possible to make fifteen combinations of punch marks in the four webs.

Culling Chicks as Taken from the Nests.

A vigorous weeding out of deformed and weak chicks at this time is good insurance against trouble and loss afterwards. It pays to kill at this stage, every chick that does not seem to be just right. Some of the weaklings may outgrow their weakness if given a chance, but many more will not, and the best way is to take no chance on a chick that does not seem to be a good chick. The loss on that chick is less now than it will be at any later stage, and the common experience has been that the great majority of the deformed or weak chicks allowed to live, make a loss at some time.

Some minor troubles, like club feet and crooked beaks, do not materially affect the health of the chick, but, on general principles, and for the sake of the good looks of the flock, it is well to dispose of these also.

How Many Chicks to a Hen?

If the chicks are all of one color, the hens will take chicks hatched by other hens, but if there are chicks of several colors hatched at the same time, unless a hen hatched all colors one must be careful in giving her odd looking chicks. Some will take them; others will kill them.

With chicks all of one kind and age, then they may be divided up as desired among the hens selected for mothers.

As long as the weather is at all cool, nine or ten chicks is enough for an ordinary sized hen, and twelve or thirteen for a large one. As the season advances, more may be given, but I have found results much better in growth and quality of chicks when I never went very far beyond these figures.

I have given as high as forty chicks to a hen, and had them live and grow to be healthy. I have run eighteen to twenty chicks with medium sized hens, and had quite satisfactory results. But comparing the general results under such conditions with results when broods were smaller, I have, for years, rarely given over twelve chicks to a medium sized hen, or fifteen to a large one, and think the better results well worth what little additional work the greater number of broods makes.

Where to Place the Coops.

There is not always opportunity for choice in this matter. With many there is just one spot available for coops, and the question becomes how best to handle chicks in this place. But when there are different situations available, that should be selected which best combines the two points we have already emphasized once in this lesson, i. e., the comfort of the hens and chicks, and the convenience of the attendant.

The best place for chicken coops, and for young chickens, is in an orchard which furnishes abundance of sun and shade. If an orchard near the dwelling can be used for chicks, this is quite the ideal place; and, of course, if on a small place, the few coops of chicks can be placed under the few fruit trees the place may have, we have the same conditions on a small scale.

Another good place is near a hedge, where the coops of the hens may be shaded at least a part of the day, while the chicks can run in the shade of the hedge, or out into the open fields at will. The conditions for the chicks may be just as good as in an orchard, but the coops have to be extended in lines, and cannot be as compactly placed as in an orchard where they may be in parallel rows, and the attendant can look after them without going over so much ground.

When the hens are confined while the chicks go at will, the coops may be placed two or three rods apart each way, and the coops shifted as often as necessary to prevent the grass being ruined under them.

When the chicks are confined while small to wire covered coops, these may be placed as close together as desired, or as the lay of the land admits, and moved the length of a coop to new ground in a block; or, if one prefers, he can place his coops separately, and shift them independently. A little study to locate coops at first with reference to the shiftings necessary, will often save some inconvenience later.

What To Do Where There is No Natural Shade.

Both shade and sun the chicks must have, and if there is no natural shade, shades must be made to cover either the whole or a part of the top of a coop. With such shade provided, the coops may be put right out in the open where they get the full strength of the sun, and will do well, though I think never on the whole as well as with natural shade, and the moist earth under it.

Transferring Hens and Chicks to the Coops.

Always, if possible, move the hens and chicks to the coops when the weather is bright and warm. Avoid moving hens with small chicks to new coops late in the afternoon. If you cannot get them out in time to give them several hours in the sun before they have to settle-down for the night, better let them wait until next morning. Older chicks are easier to move after dark, but if the small ones are moved about, then one must be very careful or the hens trample some of them before they settle down.

Let them get wonted to their new quarters before bedtime. Then, as a rule, if she has not done so several times during the day, the hen will go into the coop of her own accord, and make her nest in one corner, (the coop should have a good big handful of chaff or cut hay or straw thrown in for this purpose), and the chicks will follow her.

If, as sometimes happens, the hen insists on staying out in one corner of the pen at night, try to drive her gently into the coop. If she will not go in and stay, wait until it is almost dark, catch her and put her in the coop, closing the door so that she cannot get out, but the chickens can get in. In view of possible cases like this it is well to have coops so constructed that you can get at the hens easily when they stay out. I have to confess that mine have not always been so built, and, in consequence, I have sometimes had to fool away more time than I should with such cases. After being compelled to go to the coop for the night once or twice the hen seldom gives further trouble on that score.

Feeding the Young Chickens.

The feeding of young chickens need not differ much from the feeding of adult fowls. The young chick needs food oftener, and needs it in form appropriate to its size, but except for these two particulars the systems and methods of feeding can be the same for both small chicks and fowls,—*provided the method of feeding the fowls is good*. If the method of feeding the fowls is bad, the effects on the young chicks will be very much worse than on the fowls, and their digestive systems are easily ruined.

In this we have the explanation of the fact that so many people do really find it necessary to use a ration for their chicks different from that given their fowls, and when they do the general tendency is to go much further than necessary in fussing with foods for the chicks. In this, too, we have an explanation for the fact that the dry feed system began to be applied extensively with young chicks some time before much attention was given it in connection with the feeding of old fowls, and while I personally do not use the dry feed system for young chicks I can easily see that a great many get better results by it than by their application of a mash system.

What was said in Lesson I. of poultry foods and feeding systems for winter egg production applies generally to foods and feeding systems for young chicks, with the difference as indicated above, and with the additional difference that disadvantages in either system need to be more carefully watched with chicks than with fowls.

be considered here. Readers using such foods, and desiring to continue their use rather than any of the methods here described, may ask such questions as they wish about them, and these will be answered; but to consider the multitudes of "fussy" methods at length is out of the question.

Ration I. Mash and Grain Feeds Alternated.

I speak of the mash and grain as "alternated" for want of a word which in a word will convey the idea. They are not regularly alternated all the time, but as far as convenient and advisable the soft and hard feeds alternate.

Morning. *First Feed.*—Mash as recommended for hens in Ration I., Lesson I.

Middle of Morning.—Millet or a "chick feed" mixture.

Noon.—Wheat.

Middle of Afternoon.—Mash.

Evening.—Cracked corn.

If the chicks have grass run they get their own green food; if confined where they have no grass green food must be provided. As will be noticed, the only thing this ration calls for in addition to what is provided for the old fowls is the chick feed mixture. Such a mixture I would recommend generally in preference to ordinary millet because it gives greater variety, and is on the whole, more economical. Indeed often the cost per 100 lbs. is no greater.

Ration II. Baked Cake and Grain Feeds Alternated.

In this ration we simply substitute a baked "johnnycake" for the mash in Ration I. This cake may be made entirely of corn meal or of a mixture of corn meal with other ground stuffs. This ration is to be preferred to Ration I. where only a few chicks are to be fed, as a large cake may be baked which will last several days, giving the soft food always ready, and making it unnecessary to mix a mash daily or oftener. When so many chicks are kept that the baking of cake for them becomes burdensome, the method is preferable.

Ration III. Mash. Baked Cake and Grains Alternated.

This ration may be used if it is preferred not to have mash about after the morning feed, or if it is more convenient to mix only enough mash for that feed.

A Few Recipes for Johnnycake.

Add a little soda to sour milk; stir in corn meal or corn chop, to make a stiff cake; stir in the better. A few infertile eggs added improve the cake. Bake and serve through. Make cake thick to reduce proportion of crust.

Take one pint corn meal, one teacup bran, one teaspoonful meat meal, one cup water, one teaspoon soda, one teacup cold water; bake two hours.

Take three quarts corn meal, one quart wheat middlings, one cup bran; mix with water or skimmed milk to which has been added four tablespoons vinegar, two teaspoons soda.

Ration IV. All Dry Grain.

For this ration bought prepared mixtures are generally used.

Ration V. Dry Mash and Dry Grain.

For this again I would recommend those who use it to buy the prepared mixtures, because the chick dry mash is ground more finely than they can get it for themselves, and the mixture of grain contains a greater variety than they would give, and when they leave out mashes and johnnycakes with the variety which is secured in the use of these, and in their alternation with grain, they need greater variety in the grain.

There are scores of very good mixtures for chicks on the market, and many of them at very reasonable prices.

Common Errors in Feeding Chicks.

There is nothing mysterious, complicated or difficult about the proper feeding of young chicks, and yet most beginners have a great deal of trouble with them. So before discussing a few of the good methods of feeding let us have a statement of some of the more common errors in feeding.

1. *When soft food is used, often too much of it is used. Too many meals of soft food are given, and not enough hard grain.*

People either do not know or do not appreciate the fact that the chick unlike the young of mammals and of pigeons, has digestive organs that will take just the same kind of food the adult fowls take.

The old fashioned way of feeding chicks was to give them corn meal dough or merely wetted corn meal three, four, or five times a day. Some chicks lived and grew on this feeding because they had good range and exercise, and plenty of vegetable food and insects, but they did not then and do not now make the growth on such feeding that they do when fed a more appropriate ration.

2. *Too concentrated foods are used, especially meals—corn meal and oat meal, and hard boiled eggs.*

Corn meal may be used alone, if baked in a johnnycake, with good results; but raw or only partly cooked corn meal alone is too likely to be hard to digest.

Oat meal and various oat preparations if fed heavily have much the same effects as corn meal. One of the surprising things about opinions of feeding chickens is the persistence with which some authorities cling to the idea that oats are an ideal and very complete food, and oat meal the most desirable article for feeding young chicks; when the fact is that chicks do not like it, and the sentiment in favor of it is traditional, and not based on modern experience at all.

Oat meal and corn meal mixed together, and with bran, make a good food for chicks. The proportion of the meals to bran may be slightly greater for chicks than for fowls, because the growing chick can more readily utilize an excess of nutritious matter than the matured fowl can, but the difference in this respect in rations should be slight.

Hard boiled eggs are often fed very heavily—especially if fertility of eggs is poor—and when combined, as they too often are, with a ration which without them would be too concentrated, they are likely to aggravate any digestive disorders that develop.

3. *Animal and vegetable foods are not provided as they should be.*

Many poultry keepers who are no longer amateurs are like most novices in being afraid to feed meat meals and scraps to young chickens. There certainly is greater risk in feeding them an article of poor quality, but a good grade of meat scrap or meal may be fed quite as freely as to older fowls, though of course, if used in a mash or cake that is fed several times a day to the chicks where the mash for fowls is fed but once, the percentage of meat in the mash must be reduced or the chicks are fed more meat proportionately than old fowls.

In supplying green food to chicks the great majority of novices give it very irregularly, and rarely in sufficient quantity.

The three points stated and explained above cover, I believe, the most serious errors in the feeding of chicks. When these are avoided the other faults in feeding may not show conspicuously poor results.

Methods of Feeding.

Of these we will consider a few which may be taken as typical:

1. Mash and grain feeds alternated.
2. Baked cake and grain feeds alternated.
3. Combination of 1 and 2.
4. All dry feed—small cracked and broken grains.
5. Dry mash and dry grain.

These are all simple systems calling for the use of only such foods as are used for the old stock, or may be bought in bulk at about the same prices. The use of foods which require entirely different bill of fare and mode of preparation for young chicks will not

How Often to Feed.

In rations I., II., and III., five feedings a day are indicated. This is about right for small chicks, up to the time of weaning, when conditions are such that it is not advisable to feed more at a time than will be eaten up within a comparatively short time. For Ration IV., five feedings may be used. For Ration V., the mash may be kept before the chicks all the time, if fed in troughs or hoppers they cannot get into, and the grain feeds given as used.

Keeping Feed by Chicks all the Time.

If Ration V. is used as indicated above, one kind of feed is kept before the chicks all the time.

If chicks have good range, it is entirely practicable to put out at one time all the food for the day, a dry mash in hoppers or troughs, and the grain scattered over the ground they run over. It will be found that they feed themselves quite regularly.

Mashes and baked cakes cannot be left long before chicks without souring or drying, but under any conditions which admit of scattering the grain for the day over the chicks' range, the grain for Rations I., II., and III. may be put out in the morning when the first mash or cake is fed, and if chicks are watered then, only one more visit is needed for the day, i. e., to give the second soft food, and perhaps renew the water supply.

Sometimes it is practicable to feed all grain in hoppers, boxes, or troughs, the chicks taking sufficient exercise of their own accord, and as they forage for green food and insects.

There is, however, the danger that chicks with all grain food so easily acquired, may fail to forage enough, hence, if one adopts this method, he should continue or reject it according as he finds it works well or otherwise with any particular lot of chicks.

How Much to Feed.

Chicks that have opportunity and disposition to exercise may, as a rule, safely be fed all they will eat. Keeping food before them of course means that they can get all they will eat at any time.

The danger in feeding more than is eaten at the time is not so much due to chicks overeating of sound sweet food, as to their eating the food left over, after it has become sour or fouled.

In feeding mash and cake, one must learn by experience how much to feed to a brood. At first the hen and chicks will eat so little more than the hen alone that, as the hen generally gets a share of each food given the chicks, and is likely to see that their wants are supplied before satisfying her own appetite, the best rule I can give for first feeds is to feed the hen and brood just as if feeding the hen without a brood. Then as you give the hen five feeds instead of three, this means that you are allowing the brood about two-thirds of what you would give a hen. This is for a brood of a dozen or so. Now the chicks do not eat so much as this, but the hen, after her three weeks on the nest, will take all they leave for awhile. Then by the time the chicks are eating a perceptible quantity, her appetite has moderated. So, while the rule will not always apply exactly, if for the first two or three weeks you give hen and chicks at each feed one hen's allowance, you will be as near right as you can be by any general rule. After that time the chicks begin to eat so much more that you can better gauge the quantity by observation.

Remember that almost all poultrymen feeding chicks with hens throw out a great deal more food than is necessary while the chicks are small.

Feed Troughs for Chicks.

For a brood of chicks a bit of board about 5 or 6 in. wide by 10 or 12 long, with strips of lath nailed around the edges to form the sides of a very shallow box, makes a satisfactory trough for feeding mash, and is large enough for the brood as long as they stay with the hen. Many other simple styles might be described, but to do so here would take more space than is available.

A trough or box in which a supply of food is to be kept before the chicks must, of course, be deeper, and must be protected from rain.

Water for Chicks.

Chicks should have always before them a supply of good water. Many cases of "cramps" are caused by letting the chicks become very thirsty and then fill up with cold water.

For a few chicks together with a hen I prefer flower pot saucers for drinking vessels. Different sizes of these can be used for different sized chicks. There is no possibility of their drowning in them. They keep the water cooler than either tin, iron or wooden vessels, and though more dirt will be kicked into them than into a drinking fountain they are more easily cleaned.

Keeping Chicks Free From Lice.

If the hen and nest were kept free from lice, the chicks should need no treatment for several days. They may not need it then, but for an inexperienced grower it is always better to keep on the safe side and prevent lice getting established, for when they become numerous they do a great deal of damage in a very short time. Dust them with an insecticide within two or three days after taking from the nest, then at intervals of a week until they are three weeks old. After that they should not need treatment for lice.

I have always used Dalmatian insect powder for young chicks. There may be some of the other insect powders not composed largely of Dalmatian that are as effective, but many of them will not kill head lice on young chickens, while fresh Dalmatian has never failed to do this for me.

Apply it with a powder gun, such as can be bought at any drug store for 15 to 25 cents, according to size. Here the advantage of a convenient coop is apparent. With a box coop with hinged top, one may go in the evening, raise the top, take the hen in one hand, puff a few puffs of powder over the chicks as they sit in one corner of the coop; then holding the hen by the feet, head down, with one hand, work the powder gun with the other, puffing the powder well into the feathers, especially around the vent and under the wings.

Observe that the powder is very pungent, (it will make you sneeze) and a few puffs of it are enough. It will not injure the chicks if used moderately. I never knew of its injuring them anyway, but some claim it has in some cases.



LESSON VII.

The Care of Chicks From Weaning to Maturity.

IT IS often said that the first three weeks in the chick's life are the critical period; that if the chick lives through that period it is likely to grow to maturity.

There is some truth in this view, but it is not all true. It is not true to the extent that the poultryman is warranted in relaxing his efforts to produce chicks each of which shall make the best development of which it is capable. Indeed, I am inclined, after a good many years listening to complaints about chicks that do not thrive, and with a vivid recollection of some faults I have seen in my own work with poultry, to consider the period just after weaning the most critical period in the life of a chick reared by the natural method. Let me give a single illustration.

While the hen remains, or is kept, with the chicks, she relieves the owner of responsibility in regard to supplying them with heat. After the chicks are weaned the attendant must make sure that they do not suffer for lack of heat. They may not need supplied heat at all, but if they do they must have it, and whether they get it or not depends generally upon the judgment of the attendant, and his attention to his business.

Age for Weaning Chicks

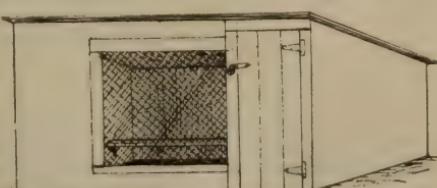
The age at which chicks should be weaned depends upon the weather and upon their condition, especially the condition of the plumage.

Left to herself, the average hen would wean her chicks at six to eight weeks of age. This may be all right for chicks coming to such age in this latitude after the middle of June, but earlier than that chicks left to themselves are very likely to get chilled, and it is safest to see that they have some heat supplied until one feels sure they do not need it. Prior to May 1st, chicks, unless in a very warm house or coop, may need more warmth than they themselves furnish, up to ten or twelve weeks of age. After that they should, if well developed and feathered for their age, get along very well with the same kind of accommodations the old fowls have.

Coops for Weaned and Growing Chicks.

The accompanying cuts show two somewhat similar styles of coops for growing chicks. (I would just say, by the way, that it has become quite the custom to apply the term "growing chicks" to the chicks after weaning, perhaps because the rate of growth of thrifty chicks, from weaning to maturity, being very clearly noticed, while earlier growth seems slower).

The first coop shown is one that may be used very early in the season, and which is so constructed as to make the chicks secure when the coop is closed. This coop may be built with or without board floor.



Secure Coop for Growing Chicks.

The second style is more common, and, when there is nothing to molest the chicks at night, is preferable, because more airy in warm weather. It must be remembered in using coops like these that the cubic air space in the coop is very much less in proportion to floor and roosting space than in a house for adult fowls; hence the necessity of making ample provision for fresh air.



A Common Style of Roosting Coop for Chicks.
they can be shifted easily to new locations, and no cleaning of floors is needed.

The dimensions for such coops as these should be 6 to 8 ft. long, about 3 ft. wide, 2 to $2\frac{1}{2}$ ft. high in the rear, and 3 to $3\frac{1}{2}$ ft. high in front.

Capacity of Roosting Coop.—The capacity of coops approximating the dimensions given above, is about thirty well grown chicks, and this is about as many as it is advisable to put into them, for though a much larger number of chicks just weaned could be kept in such a coop, it is much better to put into the coop at first not many more than the coop will conveniently accommodate when the chicks are well grown. Then one need not fear the effects of over-crowding by the chicks outgrowing their quarters.

Other Arrangements for Growing Chicks.

The coops illustrated above furnish substantial neat coops exactly adapted to this special purpose, but many other arrangements are possible. All the chicks really need is *shelter*, and during summer weather it need not be very complete shelter. One of the nicest lots of chickens I ever had were kept at night, from June until late in October, in a makeshift, temporary coop, the back of which was a strip of the board walk we used over the gravel walk in winter. This was 16 ft. long and 2 ft. wide, and made the coop two feet high at the back. The ends of the coop were two sides of a dry goods box, 2 ft. square. The open front of the coop was 2 ft. high the length of the coop. A board 10 in. wide at the top of the front kept the rain from driving in, and to this and to the edge of the back were nailed short pieces of old goods boxes, making a roof through which rain might drip, but would not drive. This coop remained in one spot in an orchard where the ground sloped just enough to let all droppings work out of the coop, leaving the floor always clean.

I give this as an extreme illustration of the useful makeshifts for the purpose our present lesson considers. We do not want such arrangements for permanent use, but for an emergency, and especially when it is necessary to get chicks out of a crowded and badly ventilated coop or house, such quickly improvised coops are a good thing. Give the chicks room if you can do no more to provide it than to make a rude shelter of boards.

Letting Chicks Roost in Trees.

On the score of general health there is no objection whatever to letting chicks roost in trees. The objectionable features of it are that the chicks acquire too much readiness to fly, that they are not easy to get at, if one has occasion to catch them, and that their habits have to be radically changed in the fall when they must go into the houses.

Teaching Chicks to Roost.

Many chicks of the light and medium weight varieties begin to roost of their own accord about the weaning age. If, when they are first put into roosting coops, one or two hens are left with each bunch, the hens may soon teach the chickens to roost. The chicks may sit on the floor for awhile, but, as a rule, if a few begin to roost, the rest, one by one, follow their natural instinct, and before long the entire lot will be roosting. If they do not begin roosting as they should, even with a few old birds for guides, put a wide board in place of a roost, about ten inches from the ground, and extending back to the wall, and go after dark and put chicks up on this. Generally after a few lessons they will go up of their own accord. Then

Many other styles of coops suitable for chicks might be given, but this general plan seems to be that which gives most general satisfaction. Wherever it is safe to use a coop without a floor, coops should be built that way. Then

the board may be moved out from the wall, so that chicks crowding to the wall will drop off, and when the chicks learn not to huddle to the wall, take out the board and put in its place an ordinary roost.

Chicks of the heavy breeds ought not to roost as early as the others. Many of them will not roost until about full grown, and chicks from Brahma or Cochin stock that have been kept without roosts for generations are sometimes very hard to teach to roost. I have had some that I gave up, and let have their way.

If chicks will roost it is better that they should, for on the roost they are not crowding and sweating, nor are they fouling themselves in their own droppings. The one thing to avoid when chicks roost young is crooked breast bones, and with roosts three to four inches wide no more of these occur than would probably develop regardless of roosting conditions.

Yard Room and Range for Growing Chicks.

To grow good chicks without extraordinary attention it is necessary that they should have plenty of room outdoors. I would make the minimum of yard room about the same as for adult fowls when yards are to be kept in grass, and would double this if possible. The more room you can give your growing chicks the less care you will have to give them, and the less risk you run in raising them. When chicks are kept in small yards, the yards late in the season become very foul, and they will not thrive on foul ground as they will on clean fresh ground—especially a nice grassy lot.

By giving due attention to all their wants, seeing that their quarters are kept quite clean, and providing exercise and sufficient supplies of animal food and green food with the grain ration, good chicks may be grown in very limited quarters, but I doubt whether, when time and expense are considered, there is any profit in growing stock that way except for market. Crowding tends to shorten the period of development, and to make chicks sexually mature before they are full developed physically. That is one of the reasons why market chicks, if thrifty, make a plumper, better filled out, as well as a softer meatied, carcass than chicks given more liberty. The chick given good range develops a better frame which subsequently fills out fully, but for quick development for market condition confinement is preferable. So poultrymen are accustomed at about the weaning age to separate the chicks destined for market from those reserved for stock purposes, and handle the two lots differently.

Feeding the Growing Chicks.

The methods of feeding chicks after weaning are, or should be, a continuance, with some modifications, of the method followed previous to that time. A radical change of methods of feeding at this period is most unwise, and unless the feeding of the small chicks is much the same as that of old stock, the feeder should begin weeks before weaning, and change gradually from the baby chick ration to that which is to be used this season. The growth of a thrifty chick at this period is notable from week to week, and the amount of food consumed increases very fast.

The chicks have now attained such size that they are no longer easy prey to cats, crows, small hawks, and other enemies which hunt by day, and so may be given more liberty, and kept further from the dwelling with less risk of loss. Under such conditions, with good range and sun and shade, the feeding proposition becomes so simple that if the chick has reached this stage with good sound digestive organs, it is quite impossible to go wrong with it. The general conditions correct any errors in feeding, and it will make practically very little difference what method is used—provided the chicks get enough to eat. It is, further, almost impossible to overfeed chicks under such conditions, and the thing to avoid is not overfeeding on account of danger to the chicks, but overfeeding with consequent loss of food before the chicks eat it.

Still, in giving food, one can put it out much more freely than if the chicks were confined to a small area, because if the grain is broadcasted they do not foul it as they do food in coops or small yards; and if fed in hoppers, or even in open troughs, they do not linger around these as they would if they had no opportunity to forage, and so the place is cleaner.

If the yards, while giving a fair allowance of room, are still so small that it is thought best to feed several times a day, the feedings may be reduced to three or four, and these timed to suit the convenience of the keeper.

My usual method of feeding chicks, from weaning until they go into winter quarters, is:

Morning.—Mash.

Morning.—(As soon after the mash is fed as I get around to it, say, within an hour). Wheat or cracked corn—wheat if price is right. Enough is thrown broadcast in the grass to give them something to look for, and still find good picking until late in the afternoon.

Afternoon.—(About 4 to 5 o'clock, as I happen to get home from the office).—A good feed of fine cracked corn. If it is early so that the chicks have time to hunt for it, and still get a good feed before 6 o'clock, I scatter the grain widely. If it is a little late I throw it down in handfuls on the shorter grass.

Evening.—(Just as the chicks are going in for the night).—All the mash they will eat. Chicks will eat a good bit of mash after having had their fill of hard grain, and also will eat quite freely of grain after having eaten all the mash they want.

To get the best possible growth the chick must be full fed daily. If it has good digestion, and can take plenty of exercise, heavy feeding will not hurt it, unless the proportion of meat scrap in the mash is too great. My observation, however, has been that very few err by giving growing chicks too much meat. The general tendency is to give them too little, and the digestive troubles which chicks develop during this period are generally due to crowding and lack of exercise and green food combined with heavy feeding.

In other words:—

Under natural conditions overfeeding is almost impossible, while,

When chicks are confined in too restricted quarters we have to be careful in feeding them, not because the feeding system is bad, but because the other conditions interfere with digestion.

Under artificial conditions we have to balance rations with a care we need not use under natural conditions.

The system of feeding given above differs from that I use for adult fowls only in that grain is given rather more freely, and a second mash is given supplementing the last feed of grain. Such feeding as this constitutes "forcing," or not, as you look at it. If chicks are given a meal of only one kind of food, and we take what they eat that way and the results obtained as our standards, then whatever induces them to eat more than by this system is forcing, and any better results thus obtained are due to such forcing.

But consider this, instead, from our own point of view. Do we not eat more when we have a variety (not too great) at a meal than when the meal is comprised of but one or two plain and perhaps not very palatable foods? As I look at it, by giving a variety we are not forcing the chick, we are simply securing the fullness of development. All the feeding and heavy feeding the chick can stand stops short of forcing. Forcing begins when the chick cannot stand the ration given it, and its digestion gives out, or it goes down on its legs, and as has been said these troubles are avoided by making conditions which admit of heavy feeding, better than by keeping conditions bad and making rations to suit faulty conditions.

Different Rations for Different Purposes.

From what has just been said about the relations between feeding and conditions the reader is prepared to understand that the simplest way to arrange for feeding for different results is to change the conditions, letting the system of feeding remain the same.

There are two kinds of results to be considered in feeding chicks after weaning.

1. *Feeding chicks for stock purposes, that is, chicks to be used when mature for layers or breeders.*

2. *Feeding chicks to be marketed at the most profitable marketable size.*

For chicks for stock purposes we have to either give conditions or make a ration which they can stand indefinitely.

For market chicks the final consequences of feeding and conditions may be disregarded—provided they are not reached before the chick is to be marketed.

Suppose now a poultryman has a lot of chicks, the pullets and a few cockerels of which he wishes to reserve for stock purposes, while the rest of the cockerels he will market as soon as possible.

He shuts the cockerels that are to be marketed in a small yard, and feeds them the same as the others, but as they take little exercise, they grow faster, put on fat more readily, and are soon in salable condition.

The chicks for stock purposes he gives more room, they take more exercise, develop larger frames and grow constitutionally stronger, while the others, though putting on weight more quickly, are growing constitutionally weaker. In the long run the chicks that are given the best conditions will make the better development, but for quick returns and profits from meat the other way is better, the chicks being disposed of before they break down under the forcing process.

Making the difference in conditions, and consequently in the method of feeding, will be found the most economical way of special feeding for special results. There is no need of special foods for different purposes.

Separating Chicks.

Perhaps it would be more appropriate to say, "assorting the chicks." Some authorities put great stress on the separation of the sexes early in life; but separation according to age and size, and the separation of the thrifty from the unthrifty are of greater importance. The separation of the sexes of thrifty chicks of the same age and size need not be made at all when they are to be handled the same way, except when the cockerels begin to annoy the pullets. This time will vary with different breeds, so we have a general rule, but a special application of it in each case. Leghorn males are very precocious. In Asiatics it is not at all uncommon for the pullets to begin to lay before the cockerels of the same age would offer them any attentions. Between these extremes we have cockerels of different breeds arriving at the age when it is advisable to separate them from the females at varying periods, and the only point necessary to observe is to remove a male that annoys the females in advance of their inclination.

Overcrowding.

Too much emphasis cannot be placed on the importance of preventing the overcrowding of growing chicks. With an ordinary sized brood with a hen there is practically no possibility of overcrowding while the chicks are small, but after the chicks are weaned they grow so rapidly that a coop that was adequate when they were eight weeks old, may be entirely too small when they are twelve. A great many poultrymen leave their chicks, after weaning, in the small coops in which they were kept with the hen. This practice sometimes works all right, but is uncertain, depending much on the disposition of the chicks in each lot. If, when they find the coop too small and close, they sit on the ground outside, or on the coop itself, no overcrowding will occur, but if they all push into the coop and pile up there, one warm night will spoil many weeks of good growth.

There is special need of guarding against overcrowding when chicks are kept in coops or houses that are closed at night. Many coops or houses are so constructed that it is not possible to get such circulation of air into them on sultry nights as there should be to give the chicks what fresh air they need.

Fresh air they must have. They can no more thrive without it than without food. It is because so many poultrymen fail to provide ventilation suitable to warm weather conditions that so many lots of chicks that start well in the spring are spoiled in the summer. The number so injured, and the total loss in consequence, are very much greater every year than anyone who has not looked into the matter would believe.

Chicks can be kept (roost) in quite small coops provided there is free circulation of air, but if the chicks are to be confined where air does not circulate freely the number that will do well in a place is hardly greater than the number of adult fowls that would be considered right in that place.

Keep the Chicks Growing.

A well known poultry writer is accustomed to assert that the secret of success in winter egg production is to keep the chicks growing from the shell to maturity. That may not be all there is of it. Looking over the subject we can see other essentials not included in his view, but it certainly is of great importance to have the chicks develop steadily without check or setback.

To insure this there must be constant attention to the wants of the chick. Now I do not

mean by this that the attendant must be forever doing something for them. On the contrary I think chicks will stand a great deal of judicious letting alone. But the attendant must see that the chicks want nothing, lack for nothing essential to their comfort and development.

They need alternate shade and sunshine. They need good water, and all they want of it. It should be before them all the time. There should always be food available for every chick to get all it will eat, and while a great variety is not necessary there should be sufficient variety to give the necessary proportions of grain, vegetable and meat foods. If these are supplied freely the chick balances the ration for itself. Too often the meat and vegetable foods are supplied spasmodically. This is especially the case when chicks are kept in close quarters and dependent upon the attendant for everything they get. While growing they need good feeding even more than after maturity. A hen of good constitution may go underfed for quite a long time and not suffer permanent harm, but a chick that is underfed fails to grow, and practical poultrymen agree that chicks of this kind are made up of subsequent good care and feeding so rarely that practically such injuries are irreparable.

Late Hatched Chicks.

For many years the idea prevailed that chicks hatched late in the season could not make the development of the earlier chicks, and that late chicks were as a rule not profitable. Gradually this notion has broken down as poultrymen find that given breeding stock in as good condition, given the same care the early chicks had, and above all, given fresh ground to start on, and not ground contaminated by the early chicks, late chicks will thrive as well as early ones, and will have made as good growth at corresponding ages.

The first difficulty is to get the stock in good condition late in the breeding season, and it is quite hard to do this with hens except such as have had a rest during the spring.



LESSON VIII.

Points to be Considered in Poultry House Construction.

AS I THOUGHT over the matters to be taken up in this lesson, and tried to determine the most suitable title for it, it seemed to me at first that it would be most aptly described as a discussion of principles of poultry house construction. But when I began to inquire which of the propositions I might produce in this connection I could call "principles," I concluded that that was a word which might as well be omitted, for there are very few of the customs and methods of building, or styles and plans of houses for poultry, that are so universally accepted that one is warranted in designating them as principles, or laws. Those upon which agreement is most general still lack very much of being even common rules.

Occasionally we find a certain kind or type of poultry house prevailing in a certain territory, or used by many because highly recommended by someone whose opinion is regarded as authoritative, but, taking poultry houses as they come, the more one sees of them the more "the wonder grows" that so great variety of plans should be devised for buildings for the simple purpose of affording shelter for fowls. It should be said, though, that the greater number of these houses, and especially the "freak" buildings, were not designed by people who had had experience in handling fowls. This is a matter the reader would do well to keep in mind when examining poultry houses, and listening to the opinions their owners express of them: and if an odd plan or feature attracts their attention, it is well for them to ascertain whether it was designed before the owner began to keep poultry, or after some experience with various styles of poultry houses.

Why the Housing Problem Sometimes Becomes Difficult.

It is almost impossible to make a single poultry house for a small flock that will not, with reasonable use, give fair to good satisfaction.

When, however, the owner of such a satisfactory small house makes it the unit in a system of houses for a large flock of poultry, he very often gets buildings that are far from satisfactory—an inconvenient feature that seemed trifling in the single house becomes intolerable when multiplied by ten, twenty, or perhaps fifty, while features of construction or design which were unobjectionable in the single small house, work altogether differently when applied on a larger scale.

To illustrate: A one pen house may be 16 or 20 feet wide, and with windows in the ends, and three-fourths of the outside wall surface touched by the sun at some time of the day be dry and comfortable, and sunny. But make one such pen the unit in a house containing, say, ten pens, and in eight of these pens the only sunlight received comes through the windows in one side, and it is impossible to get the sunlight to the back part of a pen 16 feet wide without making the building high in front, thus adding to the cost without increasing the capacity.

Another point to consider in this connection is this:—In housing poultry we have too often a problem corresponding not to the housing of human families in roomy, detached dwellings, or of a few domestic animals in ample barns or sheds, but to the housing of population in flats and tenements, or to the provision for the health and comfort of human beings congregated in large numbers as in schools, churches and public gatherings.

The ventilation of a dwelling house is a comparatively easy matter. Under ordinary circumstances no attention need be given it but such as any sensible person will give almost instinctively. But to maintain a supply of pure air and still keep up the temperature in a school room where forty or fifty pupils are kept for several consecutive hours, or in a church where 500 to 1,000 people are together for an hour or two, requires more general knowledge of the principles of heating and ventilation, and also special knowledge of their application to the existing conditions; and it is for want of such knowledge in those in charge of such places that bad air in an underventilated or drafts in an overventilated room make public places more productive of colds than private dwellings.

In the poultry house, as a rule, we find much the same conditions. Nearly every poultry keeper either builds the smallest house possible for the number of fowls he intends to keep, or having a building or buildings of certain dimensions stocks them to their fullest stated capacity—and sometimes away beyond. And if in anything different, the conditions are harder in the poultry house, for the children in school are there for two relatively short periods; the people at a public gathering are together in the same enclosure for only a short time, while the fowls are often confined to the same restricted quarters day and night for months. To state the point in its simplest form, the artificial methods of managing fowls often make housing an intricate problem, when with more natural methods it would be a very simple one.

It is for each poultry keeper to determine for himself what kind of problem in housing he must work out, and after presenting in this lesson general information on poultry houses, materials and construction, we will, in several consecutive lessons, describe houses adapted to a variety of conditions ranging from the simplest to somewhat complex, but stopping quite a long way from the limit in that direction.



Methods of Housing Laying and Breeding Stock.

In systems of housing adult fowls, we have at one extreme the colony plan, which, in its simplest form, consists in placing small houses for flocks of a few dozen fowls far enough apart to obviate the use of fences, and give the flocks free range with very little mingling of fowls from different flocks; and, at the other extreme, a connected series of houses, each containing many pens which connect each with the adjoining pens, or all open on covered walks running the entire length of each house. In what we call the extreme type in this house arrangement, the various accessory buildings of the plant are located in such manner, and so connected with the poultry houses, as to make it possible to do all the work under cover.

The number of possible plans and arrangements between these two extremes is unlimited. To enumerate fully the common and familiar house plans would make quite a formidable looking list. We will discuss here only a few of the most popular, the most useful, and the most interesting plans and arrangements. Some of the latter class call for notice not because of the merit of the plans, but because their features seem to appeal very strongly to novices in poultry culture.

We classify the houses we are to discuss, then, as follows:

1. As to Position of Pens or Compartments.

(a). SINGLE PEN HOUSES.

Usually these are small houses, the ordinary one pen poultry house having a floor area of about 100 sq. ft., but sometimes they are large enough for flocks of 100 or more, with floor area of 500 to 1,000 sq. ft.

(b). TWO (OR MORE) PEN HOUSES WITH CONNECTING PENS.

This is the most common arrangement where a few small flocks are to be kept in the same building.

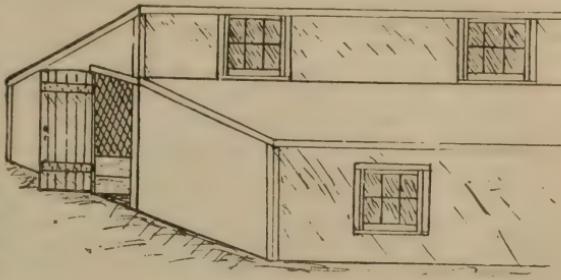
(e). TWO (OR MORE) PEN HOUSES WITH WALKS EXTENDING THE LENGTH OF THE HOUSE, AND ACCESS TO EACH PEN SEPARATELY FROM THE WALK.

This is the most common arrangement where more than a few small flocks are kept in the same building.

Position of the Walk.

In a house facing south with one row of pens, it is customary to put the walk along the back or north side, but occasionally the walk is put in front. This latter arrangement seems to me to have little to recommend it, and in many hundreds of houses that I have inspected, I have seen not more than two or three with walk in front.

In a house with two rows of pens, the walk must be in the middle. Such a house may face south. In that case, the south pens in front of the walk should have low roof pitched to the south, the north



Semi-Monitor Top Roof.

pens a high roof pitched to the north, as shown in the accompanying cut. Or the pens may face east and west, the length of the building running north and south, and the walk in the middle the entire length of the building.

I don't think the walk in the middle is ever found very satisfactory, except in comparatively short houses. The east and west front does not work well where winters are severe, but where winters are mild and summers oppressively warm, its faults are not serious in winter, while, as a summer house, it is superior.

2. As to Construction of House With Reference to Methods of Handling Fowls.

(a). ORDINARY CLOSED HOUSES.

That is, houses with doors and windows arranged with reference only to ingress and egress, and to light.

(b). OPEN FRONT SCRATCHING SHED HOUSES.

In this type of house each house, or each section in a series of pens, consists of two compartments, a closed roosting room, and, connecting with it, a scratching shed with open front.

(c). SCRATCHING ROOM HOUSES.

This type of house is intermediate between the other two, and is by all odds the best type devised to date. It differs from the ordinary closed house in having doors and windows designed to give it when open all the advantages of the open front scratching shed, while when closed in bad weather they make it a close house and more suitable to such conditions than the open front shed. It has the additional advantage of giving greater capacity than the double compartment scratching shed plan. In that plan poultrymen found in practice that the capacity of a section was no greater than the capacity of the scratching shed, in which the hens passed most of their time. The most common dimensions in such houses have been 10 x 18 ft. sections divided into roosting room 8 x 10 ft., and scratching shed 10 x 10 ft. By removing the partition and throwing the two compartments into one the capacity became the capacity of the floor of the entire section.

Why "Scratching" Shed and Room?—Most readers whose interest in poultry culture dates not more than a few years back will have some curiosity to know how the term "scratching" has come to be given so much emphasis in connection with housing systems. The object of the open front scratching shed was to make a special place for fowls to take air and exercise

together, the floor being littered with hay, straw, or some such material into which the grain was thrown and the fowls obliged to scratch for it. The practice is so general now that many will be surprised to learn that so recently as ten years ago there were probably several poultrymen making no provision for exercise to every one who did make such provision. In the ordinary closed house the floor is often littered to furnish exercise, though there is not the same provision for fresh air as in the so-called scratching room house.

3. Styles of Roofs.

In describing these we will consider only roof plans for which there is a practical reason. In these we may have:—

(a). *The Single Pitch Shed Roof Sloping North.*

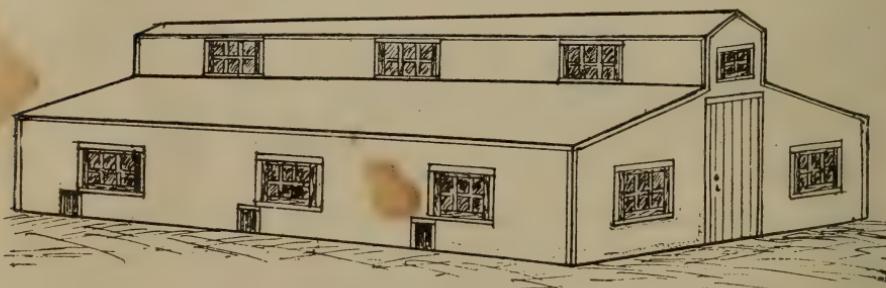
With this style of roof we may have either a moderately high (for a poultry house) front (or south) wall, and a low rear wall, or if we wish the wall at the back of ordinary height, the front wall must be quite high. Houses are sometimes built the latter way, but it is not an economical plan, and has, on the whole, no special advantage.

(b). *The Single Pitch Shed Roof Sloping South.*

This plan is more popular for brooder houses than for houses for laying stock, though one may find a good many houses for adult stock built with such roofs.

(c). *The Double Pitch Roof With Equal Sides Pitching North and South.*

This is probably more generally used than all other styles of roofs combined.



Monitor Top Roof Poultry House.

(d). *The Double Pitch Roof With Equal Sides Pitching East and West.*

This plan of course is out of the question on long houses running east and west, but it could be used to good advantage much oftener than it is on small houses, as will appear in some of the house plans to be given in following lessons.

(e). *The Double Pitch Roof With One Long and One Short Pitch.*

This is often used on low houses with walk at one side; the short pitch being over the walk.

(f). *The Monitor Top Roof.*

(g). *The Semi-Monitor Top Roof.*

The last two styles should be considered only when peculiar conditions make it necessary to build houses of such styles.

Height of Walls.—The poultry house should be high enough to allow a man of average height to work comfortably in it at any work that has to be done there. The relative height of opposite walls will depend on the roof plan, or vice versa.

It is a mistake to try to economize in material, or to make houses warmer by making them too low for convenience of those doing the work in them.

4. Quality of Construction.

Many poultry houses are built much better than is necessary, either because the builder thinks that the more substantial building will be easier to operate, or because he wants the building done once for all. It is better to begin with the least expensive buildings that will

answer the purpose. Then there is no capital unnecessarily tied up in buildings, and if — as is very likely to be the case — the poultryman with added experience thinks it advisable to build differently, he can do so, altering or replacing a cheap building, when he could not change or do away with an expensive one.

A low cost building need not be unsightly. If neatly built, painted, and the surroundings orderly and well kept, it may present a much better appearance than a better building not so well cared for.

Keeping what has been said in mind, and noting that the expensive house is built because the poultryman wants it, not because the fowls need it, we note these classes of construction:

- (a). SINGLE BOARDS, WITH OR WITHOUT BATTENS.
- (b). SINGLE BOARDS COVERED WITH ONE OR TWO THICKNESSES BUILDING PAPER OR ROOFING.
- (c). SINGLE BOARDS COVERED WITH PAPER AND SHINGLED, OR COVERED WITH LAPPED SIDING OR MATCHED LUMBER, MAKING A SOLID DOUBLE WALL.
- (d). DOUBLE BOARDS WITH DEAD AIR SPACE BETWEEN, THE OUTER WALL COVERED WITH PAPER, PREPARED ROOFING, OR SHINGLES.

Of these constructions, b. and c. are the most common. The framework for such buildings is very light — only what is necessary to hold it together.

Poultry houses may also be built of almost any material used for other buildings, except such material as the corrugated iron often used for cheap warehouses. I would not say positively that that form of construction could not be made satisfactory, but the few attempts to use it I have seen have not given good results.

Poultry houses are also often built of discarded material of various kinds, not ordinarily used for building purposes. Very serviceable buildings are made of old railroad ties laid or set on end close together, and the interstices chinked with clay or mortar, as in the log houses of earlier days.

In sections where stone is abundant the rear wall, (especially if the house is set into a bank), is often, and sometimes the end walls also, built of stone, and the whole building may be of stone or brick if desired; but unless it can be built without cash outlay for labor this is too expensive where economy has to be considered.

5. Capacity and Dimensions.

One of the first points to be considered is the capacity of a house of certain dimensions, or the dimensions required to give a desired capacity.

Floor Space per Fowl.—The common rule is five or six square feet of floor space per fowl. This is for ordinary sized flocks of one dozen to, say, three or four dozen. For a smaller number of fowls more floor space per fowl should be given, for a larger flock the space per fowl may be somewhat reduced, for while it is customary to estimate poultry house capacity according to average square feet of floor space per fowl, that way is misleading if the average for flocks of ordinary numbers is made the basis of a general rule.

Each fowl in a flock has the use, in house and yard room, of all the house or yard area not actually occupied by its companions. That is, the fowl practically has the use of the entire house and yard, and while with a flock of ten hens in a house containing 60 sq. ft. floor space, the average for each hen is 6 sq. ft., each hen really has the use of 60 sq. ft. of floor, and has much more room than a single hen in a house, giving her 20 or 30 sq. ft. floor space all to herself.

Cubic Space per Fowl.—This need not be numerically reckoned. In a house with floor space right for the number of fowls to be kept in it, and with height right for the workman, there will be air space enough if ventilation is properly done.

Proportions of Floor.—For the maximum of floor space at the minimum cost, a building should be square. To make a building of many pens square, or even approximately so, is obviously out of the question, and as buildings for poultry are usually constructed with side walls about 6 ft. high, if of equal height, and averaging about 6 ft., if the walls are of unequal height, the depth, from south to north, of a house facing south, and having windows only in the south side, cannot be more than twelve or thirteen feet, and have the sun reach every part of the floor at some time of day. A wider house must be higher, or the parts not reached by the sun will be often damp and musty.

Now if we establish the depth of a house, or the width of each pen, at 12 ft., and make the pen square, we get too short a frontage for each pen, when the length of the pen is to be the same as the width of the yard connecting with it, as it must be generally in a long house containing many pens. So to suit the yards better, as well as to get the largest capacity in each compartment that we can, we make the pens in a long house slightly oblong, and in length, 14, 16, or possibly 18 ft, but not more than 18 ft. in a house 12 ft. wide, because the longer a pen is made in proportion to its width, the narrower it becomes in proportion to its capacity, and a flock of fowls is disturbed a great deal more by an attendant moving about in a long narrow pen or yard than in a nearly square one, where the distance they can keep from the attendant is always about the same.

Planning buildings and small yards with reference to this simple point, will save the poultry keeper a great deal of future annoyance in his work with his fowls.

Width of House With a Walk.—For a poultry house with pens 12 ft. wide, 3 or 4 ft. should be added to the width, if it is to have a walk. If a walk is used at all it is a good plan to add 4 ft., which gives a walk about 3 ft. 6 in. wide, this clear without taking anything from the pens. A 3 ft. walk is rather narrow.

6. About Foundations and Floors.

The common, cheaply constructed poultry house, if placed on a well drained spot, needs no foundation or underpinning. The sills may rest on the earth, leveled to receive them, while the floor is of earth filled in to the level of the top of the sills. The sills rot out in time, but in the judgment of some of our best poultrymen, it is much cheaper to replace them than to try to keep them from rotting, while the opinion that a poultry house must have the floor elevated enough to keep it always very dry is gradually dying out.

If one wants to build foundations of stone or brick, or to set buildings on cedar posts and fill the floor to the depth of a foot or more with stone, that is his privilege, but it is expensive and is rarely really necessary when a house is placed on a suitable site. If the site is defective, that of course is another matter.

For floors there is nothing so good as earth renewed once or twice a year, and there are few places where fowls are kept that it is not possible to get fresh earth as needed. The labor of renewing the floors is more than paid for by the advantage of the earth floor, and, for one who has a garden, by the complete saving of the manure dropped in the house and the thorough composting of manure, earth and litter. In situations not the best for poultry, a floor may be necessary, and may be of wood, cement, or brick.

7. Building Materials.

Mention has been made incidentally of—I think—all the common building materials. The low cost poultry house in any section is, as a rule, constructed of wood, and of the cheapest lumber obtainable in that section.

If it is to be of a single thickness of boards, some attention should be given to selection of lumber, and the boards for the walls surfaced on one side; but this need not add materially to the cost, for by a little care an ordinary lot of boards will answer, the best being selected for the sides, while inferior boards are worked into the roof or inside partitions.

For a building to be covered with shingles or building paper, the cheapest and roughest of lumber will answer.

Shingles.—In buying shingles it generally pays to buy good quality because they go further, and the labor of putting them on is less than for inferior grades made up largely of narrow shingles, and containing many that have to be rejected, and when laid they remain in good condition very much longer.

Prepared "Roofings."—Within the last few years very much better grades of this class of goods have been put on the market, and where a few years ago I would have unhesitatingly affirmed that shingles were in the long run the best and most economical covering for a moderate cost poultry house, what I have seen of such materials as Ruberoid and Paroid roofings makes me think it wise not to be too positive. I am not prepared to say how these goods will wear with shingles, nor can I give here the comparative cost, but will go into the matter in detail in connection with one of the house plans to be given.

Putting Money in Poultry Buildings.

In concluding this lesson I want to urge it on every prospective builder with all the emphasis possible, that the best policy is to put into poultry buildings only what money is absolutely necessary. The general tendency of beginners is toward comparative extravagance in buildings and too great economy in stock, while very few provide for the reserve of working capital which they need.

In many cases the money unnecessarily put into buildings, or put into buildings before they were needed, would have given the poultryman the working capital he needed for expenses while bringing his plant up to a profit paying basis.

Remember that if you fail your fine house is as near as anything can be to a dead loss, while if you succeed you can replace your cheap buildings by better ones designed as, with your successful experience you know you want them.



LESSON IX.

Two Plain Cheap Poultry Houses of Simple Construction.

IN THIS lesson I will describe and explain the construction of two poultry houses I have been using — the single house for three, the other for four years. I take up these plans first for two reasons: A good many readers of these lessons are asking what kind of house I prefer; the construction is about as simple as it is possible to make it, and the cost about as low as it can be made in a house built of new material without patching.

In some places short cheap boards (box boards) may be obtained, and with them houses may be built at less cost per fowl than in these houses, but the boards are very often of such quality that a house built of them needs to be covered with something else to make it look well, to say nothing of making it tight — if that is considered necessary.



A House for a Dozen Fowls.

A House for a Dozen Fowls.

The accompanying illustration shows a small house that I built in the fall of 1902. I had two broods of chicks hatched the last of June that had run together all summer, making their night quarters in an old dry goods box, and having the run of about an acre of mowing land. When they outgrew the dry goods box, all other accommodations were full, and I was very busy and had little time to plan or build. The house was designed almost impromptu, and built in the spare time of a few days. I did not try to keep account of time, but think it was about a day's work, as I did the work piecemeal and alone. Originally I had no thought of making it a model, or building others like it. In fact, intended to use it only for the chicks for which it was built until I had room for them elsewhere, and afterwards to use it as an extra house for any purpose for which a building of its size would be convenient, as for sitting hens, fattening cockerels, breaking up broodies, for a small breeding pen, to store leaves in, for any such use, or—if not needed—let it stand idle. It seemed so very satisfactory in use, however, that I afterward built one other like it—except in one particular in which the change does not appear to be an advantage—and from experience with these two houses I would—for my own use—make this the model for small colonies of fowls.

Dimensions and Materials.

This house is 8 ft. square on the ground; 4 ft. high at the sides; 7 ft. high in the middle. It has only a part of a frame of dimension stuff. No upright studs or posts are used except at the door, and these are not absolutely necessary. It is built with 2 x 6 in. stuff for sills, 2 x 3 in. stuff for plates, rafters, and other frame parts; is covered with common hemlock boards surfaced on one side, is battened on the back and half way forward on each side, and the roof is shingled over a close covering of boards.

The material for this house cost me \$12 (approximately). I was buying other lumber at the same time, and used out of the general supply, and it is quite likely that in cutting up for this house, and other purposes at the same time, I used some odds and ends, and made the actual cost slightly less than I have figured it in the list of materials given below. In many places the lumber could be bought much cheaper than in the immediate vicinity of Boston. Lumber (except shingles) for this house cost me about 10% more than for the next house to be described in this lesson, which was built the year before. Shingles cost 20% more.

List of Materials and Prices When House Was Built.

2 pieces hemlock, 2 x 6 x 16,	32 sq. ft.	
4 pieces hemlock, 2 x 3 x 16,	32 sq. ft.	
3 pieces hemlock, 2 x 3 x 10,	15 sq. ft.	
		79 sq. ft. @ \$20 per M., \$1 58
250 sq. ft. hemlock boards @ \$20 per M.,		5 00
4-5 M. 2d clear shingles @ \$3 per M.,		2 40
Battens,		1 00
Sash		60
Nails, hinges, hooks, etc.,		1 00
Total,		\$11 58

That \$11.58 is about as near as I can estimate it now, and is close enough. We will call the cost of the house, for material, in round figures \$12. The cost of building should not exceed \$3, giving us the total cost of the house \$15, not the cheapest possible house, but a neat looking serviceable building at a relatively very low cost.

How to Build the House.

The two pieces of 2 x 6 x 16 are for the sills. I have given the ground dimensions of the house as 8 ft. sq. As a matter of fact the house is 8 ft. by 8 ft. 4 in. on the ground. That is the measurement from outside to outside of sills.

It happens this way: When we cut each 16 ft. piece in two, giving us the four pieces for the sills, and put them together, nailing the side sills, which we call b b to the end sills, a a, we have our sill frame 4 in. longer one way than the other. To get the same dimensions both ways we would have to cut the pair of sill pieces to which the other pair is nailed 4 inches shorter. The difference is comparatively insignificant, but in building poultry houses, coops, nests, etc., I have always tried to follow the principle of taking advantage of little points like this whenever the lumber allowed. There is a slight gain in room, and also a slight increase in cost. The gain in room may not, in every case, be proportionate to the increase in cost, but in general I think the rule will be found a good one.

The sill frame should be nailed together with large spikes, the pieces being set on edge, not laid flat. Nail each corner with one nail first, then square up the frame, using a steel square at the corners and bracing pieces in position with temporary brace across each corner as indicated by the dotted piece.



If your lumber is not perfectly straight and true you may find it difficult to get the frame square. In that case measure 6 ft. from any corner along one side, then take a 10 foot straight pole, or strip of furring, and measure from this point to a point 8 ft. from the same corner on the adjoining side. To have your angle a true right angle, the point 6 ft. from the angle on one side must be just 10 ft. from the point 8 ft. from the corner on the adjoining side, your 10 ft. measure forming the hypotenuse of a right angle triangle.

Have your sill frame approximately square, (a very slight variation due to crooked lumber is not material) then nail the corners firmly and the braces fast.

Now put the sill frame in just the position it is to occupy, level it up and block it solidly in position. If it is on uneven ground, and to put the whole floor above the level of the highest point would make too much filling, dig out the higher side and part way across the ends as much as seems advisable, making the resting place for the sills level, then block up on the lower side.

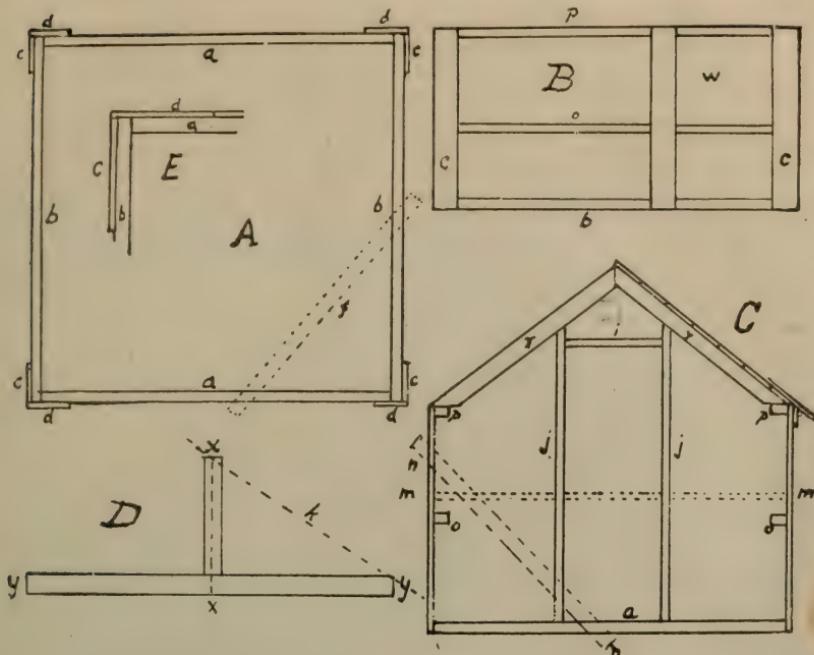
We are ready now to begin on one side. First nail to the sills the two end boards c c, 4 ft. long, letting them project 1 in. beyond the corner to come flush with the face of the end boards d d when they are put on. For these as well as for the corner boards on the ends of the house select good, clear strong boards. Be sure your boards c c are perpendicular to the sill to which they are nailed, and then put short braces n n to hold them perpendicular to the end sills.

Now put the plate p in position, the upper side of the plate being about half an inch above the end of the boards c c, to allow the first board of the roof to project over the side, and nail the upper ends of the boards c c to it. The piece o may also be put on now, its exact position to be determined by the height of the window. In my house this piece was about 6 ft. long, only its use in connection with the window being considered, but when I came to put in the roost I found that the use of a short piece was a mistake. Make the piece o the length of the side of the house; your sash will then rest, and slide on it, and the ends of the roosts can also rest on o o.

Nail on the board which comes next the window about the middle of the side, taking care to have the plate p and the stringer o in correct position. The tendency will be for both to sag a little in the middle. Use the level and keep them true. The distance from this board to the board at the front corner is the width of the window opening, and should be an inch and a half less than the width of sash. Put the other side up the same way.

Now the building is ready for the rafters, of which but three pair are required, one at each end and one half way between. To cut these nail a short strip of board x x at right angles to a longer strip of board y y, as at D in the illustration. Make a line through the middle of the short board x x to a point 3 ft. from the edge of y y. This gives the position of the apex of the roof. Now from the point where the line x x meets the edge of the board y y measure in each direction one half the length of the end of the house. In my house this is 4 ft. 2 in. In a house just 8 ft. square it would be 4 ft.

Now take a piece of 2 x 3 and lay it on your pattern so that one end and edge come at x, and the same edge crosses the board y y at g; and with a straight edge mark the lines x x and y y on the rafter. Saw on these lines and you have a correct pattern if your measurements are



Details of Construction of House for a Dozen Fowls.

A—sill plan, with position of corner boards indicated at c c c, d d d d. E—construction of a corner. B—side. C—front. D—method of cutting pattern for rafters.

correct, and you saw straight. You may if you prefer make a pattern of inch or lighter stuff. In either case having made the pattern from the upper x to one y, try it to the other one and make sure that you are right before you cut all your rafters.

If the builder of such a small house has an assistant when putting up the rafters it is easy. If he is working alone it is a good plan to nail the rafters together at the apex, and put a short brace across them near the apex, while on the ground, then put the pair in position together and nail the lower ends to the plates.

The "frame" of the building is now complete. Before nailing the rest of the boards on the sides, put the lowest board on each side of the roof, letting them project 2 in. beyond the boards c c on the sides, and the ends come flush with the faces of the boards d d on the ends. If you do this you put the boards on the sides snug up against the roof projection, and there is no fitting to be done as there might be if the side boards were all put on first. If you neglected to have the ends of the side boards lower than the upper edge of the plate, you will find that they prevent the first roof board from going into the position you want it in, flat on the rafters and projecting 2 in. beyond the side.

It makes no difference whether the rest of the roof is put on before the sides and ends or after. Leave joints about half an inch wide between the boards on both sides (and ends) and roof if you wish. If the boards happen to be of such width that wider joints will suit better, they may be as much as an inch wide on the front, or wherever they are to be

covered with battens, but where there are no battens on the sides, (principally the short boards below the window), put the boards closer together to prevent snow drifting in. Too wide joints on east and west sides may admit a good deal of snow.

On the front let the boards next the door come only to the middle of the edge of the stud on either side, and those above the door only to the middle of the cross piece. Before beginning to shingle the roof nail strips of batten on the ends as a finish, as shown in the illustration, and make the edge of the shingles project half an inch beyond these, and the first course of shingles project two inches beyond the lower board of the roof on the side. Lay shingles five inches to the weather. If you have never done any shingling it will be worth your while to take a lesson in the art from a practical carpenter. Observe how he "breaks joints," so that one joint shall not correspond with the nearest above or below it. Observe also that he does not lay the shingles close, but allows a little space for them to swell when wet. If shingles are laid too close they swell and bulge up when wet.

The back of the house is battened, and the sides are battened half way forward, thus covering the joints to a point a little forward of the roost. Before battening the sides, nail a strip of batten, corresponding with the strip under the shingles on the ends, snug up against the under side of the roof projection.

To finish the window, make the boards below it project an inch above the stringer o, and nail a short piece of furring to the plate p above the window, opening and projecting an inch below the plate. Now if your sash is a close fit, a lath tacked to o, and another to p, to hold the sash in place, make all the finish necessary, and the window slides easily back and forth. If the sash is rather loose between the stringers, use an inch piece for an upper stop.

To make the door take boards of the required length, having an aggregate width of one inch more than the distance between j j, thus allowing a lap of half an inch all around, and nail two cross pieces, two inches shorter than the width of the door at top and bottom, making the top one about six inches from top of door; the bottom one eight or nine inches from bottom. On so narrow a door no diagonal brace is needed. I have generally screwed cross pieces on, but on this door they are nailed with 6d. wire nailes clinched, and after nearly three years exposure the door is good.

A Good Cheap House for a Stock of 75 Fowls.

This house I describe here, not as I am now using it, but as I first built it; because I think it likely that a great many readers will be more interested in a house to fit the conditions I then had to consider than in one adapted to my present needs. After giving description of the house as originally built, I will mention changes made in it on removal to present location.

The house was built late in the fall of 1901, on a leased place from which I moved two years later. The fact that I would probably want to move it with in a few years, and perhaps move it some distance, had to be considered in some points of construction.

The diagram is for a house 12 ft. wide and 40 ft. long. At the east end of the house 12 ft. square is two stories high, the upper story being used for pigeons. The one story part, the dimensions of which are 12 x 28 ft., is divided into two pens, each 12 x 14 ft. The first floor of the two story part is divided in the middle from front to back, and the east half again divided in the middle at right angles with the first partition, giving on the ground floor of the two story part a pen 6 x 12, a smaller pen 6 x 6, and an entry and tool room 6 x 6.

The one story part of the house is 6 ft. 2 in. high from the lower edge of the sill to the top of the plate. The extra two inches is taken because the lumber would allow it. The posts being cut from 12 ft. stuff, and the plates being spiked on top of the posts, had the sides been just 6 ft., the posts would have been cut 5 ft. 10 in. This is what would have been done had it been necessary to make the boards outside completely cover the sill, but as there was no need that they should, I used the posts full 6 ft. long.

The two story part of the house is 12 ft. 2 in. from lower edge of sill to top of plate, with the lower edge of the upper floor joists 6 ft. 6 in. from top of sill.

At B in the diagram is shown the outline of the framing for the rear wall; at C for the front; at D for the west end of the one story part, and at E for the east end of the two story part.

The sills are 2 x 6 in. stuff set on edge and resting upon the ground. As the land lay, the east end of the space the house would cover was about a foot lower than the west end. The sills at the west end were let down into the ground about 4 in., those at the east end blocked up. Afterwards the floor inside was filled to the level of the top of the sills, and the ground outside graded as required.

The posts are of 3 x 4 in. stuff. I would have preferred 4 x 4 in., but the local lumber dealer did not have them, so I took carefully selected pieces of what he had. The 3 x 4s are all right



J. H. Robinson's Cheap Poultry House for 75 Fowls, as Used the First Winter.

for the one story part, but for the two story part they would be too light if any considerable weight were to go on the upper floor. There is one of these 3 x 4 posts at each corner of the two story part, one at each west corner of the one story part, and one midway of each side of the low part. The plates and intermediate scantlings are of 2 x 3 in. stuff. My method of joining posts and sills at corners is shown at I in the cut. At H is shown in detail the joints on a side of a corner post of the one story part of the house, and G the joints on an end corner.

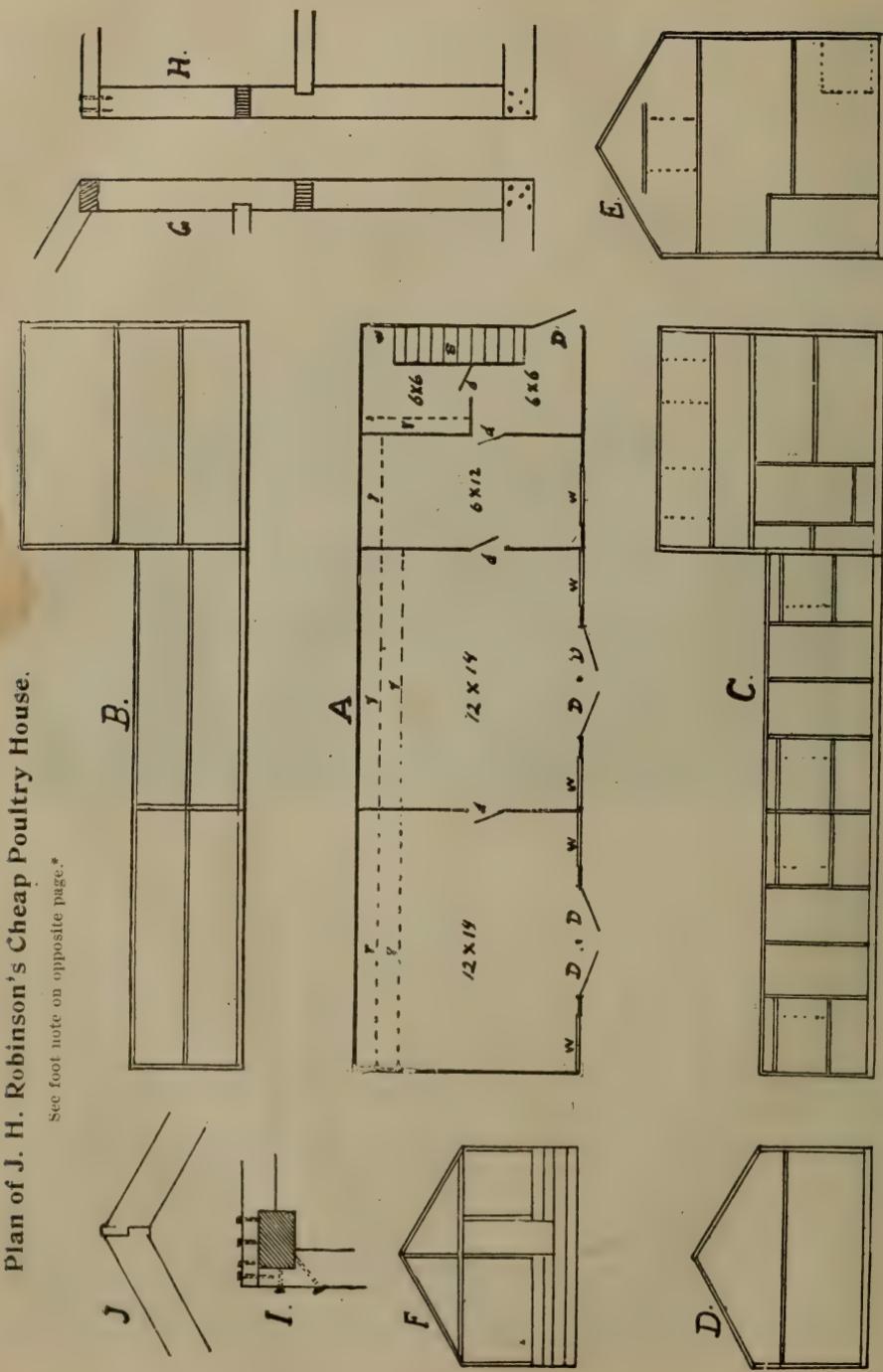
In the frame of the back of the low house the intermediate stringer divides the space between the top of the sill and the bottom of the plate, making each space 2 ft. 8 in. wide.

In the back wall frame of the high part the top stringer is so placed that the ends of the floor joists will rest upon it, and the lower stringer divides the space between the upper one and the sill, making each space 3 ft. wide.

In the framing of the front of the low part the upright studs, with the exceptions of the posts mentioned, are of 2 x 3 in. stuff, one being placed in the middle of each pen, and the others at such distance from it as required by the width of the doors, which here is 3 ft.

Pieces of 2 x 3 at top and bottom of window complete this frame. The sash I used were second hand, bought at 60 cts. per pair.

The front of the higher part has one stringer to correspond with the upper one in the rear wall, and another one parallel to it 30 in. from the lower edge of the plate, thus making the proper space for the upper windows to slide between the plate and this stringer. Pieces of 2 x 3 studding are erected at the sides of the window in the middle of the 6 x 12 ft. pen, which





West Pen of J. H. Robinson's Cheap Poultry House—Double Doors Closed.

window is a full sized window with sash to move up and down. Then there are horizontal pieces of the same dimensions at the bottom of the window, and from midway of either side of the window to the corner posts.

On the west end of the low part the stringer is 3 ft. 10 in. from the top of the sill.

On the east end of the high part the space from the sill to the lower edge of the first horizontal scantling is 4 ft. 6 in., and the space between this and the next scantling the same. The short scantling above the window is simply nailed to the boards on either side, and not connected with other frame work.

The west end of the higher part corresponds with the east end above the upper floor, but not below, the partition between the 6 x 12 pen and that next it being like that shown at F.

The rafters are of 2 x 3 in. stuff, and are placed 3 ft. apart, except that between the pair of rafters at the east end of the low roof, and the pair next to them, the space is 4 ft. This was because the furring used was in 12 ft. lengths, and as I intended to lay the shingles on strips of furring, and wanted to select the best of the furring for this purpose, I figured that there would be a little less waste of material by using all 12 ft. furring, and spacing the rafters to suit. When I came to use the furring I found a good many split and weak ends which had to be discarded, so that if I were doing it over again, I think I would buy all 14 ft. furring, and space the rafters evenly. There would be some waste in cutting the battens to cover the joints between the boards, but what short pieces could not be utilized on short joints or in piecing out on the long joints, would come in handy for something else. There is almost always a place found ultimately for such bits of lumber.

The sides of the building are boarded up and down and battened with strips of furring. The

*A, ground plan of house. D D, outside doors. d d, inside doors. w w, windows. r r, roosts. s, stair. B, outline of frame work of rear wall. C, outline of frame of front wall; the dotted lines indicate the position of the windows. D, outline of frame of west end. E, outline of frame of east end. F, an inside partition between pens. G, framing of west end at corner post. H, framing of back at corner post. I, framing of posts and sills at corner. J, method of roof construction at peak, explained in the text.

boards are of hemlock, surfaced on one side. The furring is surfaced on one side, rough on one side and edges, and the rough side is turned in, so that, as the reader will see, the covering of the joint is not wind tight. It should be added that no battens are put over the joints on the front of the low part, as with the number of hens kept in here it is not desirable that the house should, at any time, be as close as it would be with the doors shut if all joints were battened.

The roof is of shingles laid $5\frac{1}{2}$ in. to the weather on strips of $2\frac{1}{2}$ in. furring laid 3 in. apart, except that the first courses on each side are on 6 in. boards, which project beyond the sides about two inches. This makes a roof that is light and cheap, yet amply strong. The roof was put up with the idea that if it was ever necessary to move the building it could be easily taken down and set up again. With this in view, instead of directly joining the two rafters of each pair at the peak or ridge of the roof, or using — as is sometimes done — a 5 or 6 in. board as a ridge pole, I used two strips of furring, nailing the upper one firmly to the ends of the rafters of one side, and the lower one to the rafters of the other side, making practically a split ridge pole, as shown at J, in the cut.

As I framed the building unaided, this part of the work had to be done on the ground. The frame of the roof was put together on the ground in four 12-ft. sections, the rafters in each section being held together by the first strip of furring at the lower end, and the half of the ridge board attached to that section, and by two strips of furring crossed on the under side of the rafters. Each such section was put up with supports from the ground to the upper part until the lower parts of two opposite sections had been tacked to the plates. Then the supports were knocked out, and the upper parts fitted together, after which the ends of the rafters at the plates were securely nailed. All the nailing needed at the joining of the sections at the peak is what is required to prevent the light frame springing or slipping before all the strips of furring are on and nailed fast. Only one ten penny nail through each upper end of a rafter to the opposite rafter was used. The shingles used were "2d clear," costing \$2.50 per thousand.



West Pen of J. H. Robinson's Cheap Poultry House—Double Doors Open.

There is a little waste in shingles of this grade, but the quantity to be discarded was less than I expected, and of the five thousand bought I had almost half a thousand left.

The doors the floor of the upper story, and the partition through the middle of the lower story of the two story part are of matched spruce. The object of having this partition of matched stuff was to keep the dust from the pens off things kept in this part. The floor is laid on joists of 2 x 6 inch stuff, placed 2 ft. 6 in. apart from center to center. For the stairway two pieces of 2 x 9, 10 ft. long were used for stringers. Then nine steps, each having 8 in. rise and 8 in. tread.

The inside partitions are boarded up for 28 inches from the ground. Above that is wire netting.

The roosts are of 2 x 3 inch stuff, wide side up, placed 20 inches from the ground, the roost next the wall being 18 inches from it, and the space between the two roosts 16 inches. The roosts extend the full length of each pen, thus giving in the large pens a little less than one foot of roost room to each fowl. There are no droppings boards.

The construction of the outer doors is easily seen in the illustration of the house; the only fastenings on the doors in the front are hooks which, when the doors are closed, go into screw eyes in the stud in the middle of each wide doorway. The inside doors are fitted with springs. For nests empty boxes of suitable size set on the floor are used. Some of these will be shown in illustrations in connection with a future article on fixings.

The list of materials in this house, and cost of same, is given in tabulated form herewith.

The list as given does not include the fitting up of the second story room for pigeons, or the cages for them outside, though some few odds and ends of stuff left over have been worked in for that purpose. With what additional material is used to fit up the pigeons, the material in the completed building will come to just about \$70 — will not vary more than a few cents from this either way.

As I did all the work myself at odd times, I cannot give a very accurate idea of the probable cost of the labor if one hired the construction of such a building. It seems to me, though, that two good rough carpenters would do it in about three days.

For the benefit of those who simply want the lower part, or a repetition of it in sections, I give here list of materials and cost for building 12 x 28, with two pens and partition in the middle. The two sections of this house, with a capacity of sixty hens, would cost the man who built it himself \$33.10. That is \$1.18 per running foot. Perhaps a better comparison of the cost as with some other styles of house could be made on the basis of the cubic capacity of the house and its cost per foot, which in this house is 1½ cts. With cubic air space as cheap as that there does not seem to be any good excuse for not giving the hens air, and the attendant head room.



List and Price* of Materials.

6 pieces 3 x 4 x 12	72 sq. ft.	
4 pieces 2 x 6 x 14	56 sq. ft.	
9 pieces 2 x 6 x 12	108 sq. ft.	
25 pieces 2 x 3 x 14	175 sq. ft.	
14 pieces 2 x 3 x 12	84 sq. ft.	
525 sq. ft. @ \$20 per M.,		\$10 50
1,000 sq. ft. hemlock boards,		17 00
500 sq. ft. furring @ \$18 per M.,		9 00
5 M. 2d clear shingles @ \$2.50,		12 50
6 12-light windows (9 x 15) @ 60c. each,		3 60
400 sq. ft. matched spruce flooring,		8 80
Nails and screws,		3 00
5 pr. 6 in. hinges @ 10c.; 5 pr. 4 in. hinges @ 8c.,		90
Spring, hooks, hasp, and staple,		60
Wire netting,		50
—————		—————
		\$66 40

*When house was built, 1901.

Materials for Two 12 x 14 ft. Sections.

3 pieces 3 x 4 x 12	36 sq. ft.	
4 pieces 2 x 6 x 14'	56 sq. ft.	
2 pieces 2 x 6 x 12	24 sq. ft.	
8 pieces 2 x 3 x 12	48 sq. ft.	
19 pieces 2 x 3 x 14	133 sq. ft.	
	297 sq. ft.,	\$5 94
500 sq. ft. hemlock boards,		8 50
72 sq. ft. matched spruce boards,		1 58
300 sq. ft. furring,		5 40
2 windows,		1 20
3 1/4 M. shingles,		8 13
Nails and screws,		1 50
Hinges, hooks, etc.,		60
Wire netting,		25
		— \$33 10

Changes That Have Been Made or Might be Made in This House.

If I were going to build today a two pen house of the capacity of this one, I would change the construction in only two points.

The roof would be sheathed close as on the small house first described, instead of shingled on furring. The reason for this is that while the skeleton roof is strong enough it does not give a smooth, clean, easily whitewashed surface as when sheathed with wide boards laid close together. The advantage of having a good "ceiling" I think much more than compensates for the slight additional cost of the roof.

The other point I would alter would be that in each end I would put a window, either a full size window in the middle of the end, or a half window near the front, that point to be determined by the light as affected by surrounding conditions. When I moved the house I enlarged the windows in front, but find that it would have been more satisfactory to put windows in the ends, and intend to change them before next winter.

When the house was moved the larger two pen part was set up separately, and the pigeon house detached and made a one story house. I think that for either poultry or pigeons it is better to have everything on the ground floor if possible, but in case one is crowded for ground room it is sometimes advisable to use two story buildings.

Another change made in this building after moving it was to put doors in the north side to allow passage for both fowls and attendant to yards north of the building used in summer. This change made it necessary to shorten the roosts about three feet, and board up beside the door to a point a little forward of the outer roost. In winter when the fowls are in yards south of the house the doors in the north side are nailed up.

The Question of Cold Houses.

It would be out of the question to enter here into such discussion of the relative merits of "warm" and "cold," closed and open poultry houses, which consideration of the plans I have given suggests. Those who have files of the paper will find a great deal said both for and against the idea of using such a "shed" as this or anything at all approaching it in structure. I will only say here that while it is not yet demonstrated that this is the better way of housing fowls, and will give better results than close, warm houses, results obtained in these houses and the condition of the stock kept in them begin to make it necessary that one who argues against them should argue from practical experience with them—and also from sensible treatment of stock in them.

LESSON X.

Five Good Small Poultry Houses.

IN THE last lesson I gave plans and descriptions of two houses that suit me for my way of keeping fowls and doing the work for them. In this paper I give plans for five small houses, furnished by as many different readers of FARM-POULTRY, in response to an offer made to bring out good ideas of poultry house construction. These five I selected from a large number, as combining good plans and good statements for low cost poultry houses.

Let me refer in this connection to a criticism a reader of the paper occasionally makes about my advocacy of low cost poultry houses. Most poultrymen want houses to cost as little as possible, and still be as good as necessary. It is on the point of how good it is necessary for a building for fowls to be that their opinions differ. A good many people do not believe that fowls can be comfortable, contented, and productive in such houses as I use — and will not believe it until they try it. Others think that while these houses may suit my breed, they would not suit theirs — and probably they will not believe until they have gradually learned that the requirements of a breed are not absolute, but that the stock can be adapted — hardened in this case — to the conditions made for it, and that when once "acclimated" to the cold house, fowls may do as well or better in it than in warm houses.

However, houses warmer and tighter than those described in the last lesson can be built at very little more cost. Where lumber is cheap they may be built at less than mine cost. We may have cheap warm houses as well as cheap cold ones, but always, and for all poultrymen, I am an advocate of cheap low cost poultry houses, and this for two good reasons:—

(1). Because every dollar unnecessarily tied up in buildings is a handicap on the profitable operation of the plant.

(2). Because costly expensive buildings always seem to me inappropriate for live stock.

If a man wants to build expensive poultry houses, I feel that it is better he should look elsewhere for the expensive features at least. The plain, simple plans I give will, of course, work just as well if worked out in more expensive material, and if that is all that is wanted, an architect's or builder's services are more useful at that stage than those of a poultryman — provided always the builder or architect does not make some change to suit his ideas of what is correct from his point of view, but wrong from a poultryman's. That is the point to guard against when professional builders begin to improve the plans of poultrymen.

So because the great majority of readers of these lessons want to build economically, as well as because I have myself no interest in costly hen houses, I will introduce into these lessons no plans of poultry houses having features which poultrymen generally would agree were superfluous, or calling for expenditure which would be commonly considered extravagant.

In presenting the following plans I will give the descriptions as furnished with the plans, except where it is as well to condense; and where there seems to be occasion for comment on a plan or statement, will make such comment immediately after.

A New Jersey Farmer's House for Twenty-five Fowls.

Grant Davis, Whitehouse, N. J.

Of plans of hen houses there are no end. Many are good, but many more fail as to the two main points of a good poultry house: *First, dryness; and second, a plain, smooth interior surface.* I have tried various kinds, but have settled upon the following plan, which, I think, meets the requirements of a first class house, at the same time being plain and economical.

I build for poultry on the farm, and make the houses 12 ft. by 18 ft. or 21 ft., for accommodating forty to fifty hens. For twenty-five hens the house may be built in identically the same way, and smaller in proportion. As estimates of costs are wanted, I will make my figures on a building 9 ft. by 12 ft. In height it is 6 ft. at the back and 8 ft. in front, with a roof of one slope. Pillars are set in the ground for a foundation and to receive sills 4 x 5 in. in size. The enclosure is of novelty siding or ship lap, and is boarded horizontally. The studding are 2 inches square, and placed 18 inches apart. The roof is sheathed with second class lumber, and covered with roofing paper or rubberoid.

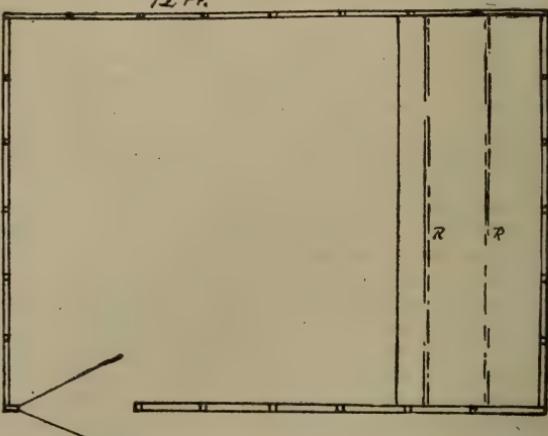
To have a hen house that is always dry it is necessary to have double walls with an air space between. With a single enclosure moisture will sometimes be condensed upon the walls, and at times will make the house damp in spite of anything that can be done. A damp house, whether it comes from a leaky roof, condensed air moisture, or capillary water from a ground floor, will soon take the profits out of the winter egg business. A double enclosure also gives greater warmth, as the dead air space, being a non-conductor of heat, serves to prevent its escape at night. The added cost of this kind of building, as ordinarily made, is against it, but, as here constructed, the cost is not much increased.

The building having been made as described, the inner wall is made by simply nailing on to the studding a stiff building paper, something strong that the fowls cannot pick to pieces, and that will take whitewash readily. As this generally comes 36 inches in width, and enough more to allow for lap, I have put my studding the proper distance to receive. The ceiling is also covered in the same way. Where the lap comes a liberal application of coal tar is made, so that on the whole interior surface of the house there will be no hiding place for lice or mites. The ease with which such a house can be whitewashed is a strong point in its favor.

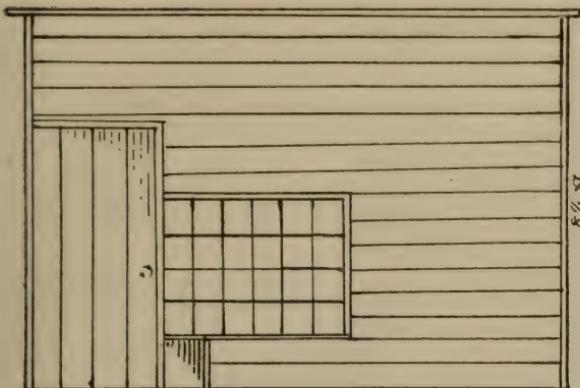
After the interior covering is put on, a panel of 1 x 3 in. boards is nailed all around the inside about 4 ft. from the floor to hold the roosting poles and to receive the nails on which hang the movable nesting boxes. The roosting poles, two in number, will extend across the narrow way of the house, and the space beneath them is cut off from the remaining floor space by a board. Straw is kept here, and the droppings are occasionally dusted with lime plaster to keep down odors, as they are not removed oftener than once or twice every month.

There are no droppings boards, no rows of nests built to the walls, in fact, nothing but what can be easily removed when the time comes for the semi-annual whitewashing.

I do not put in board floors on account of extra cost. The ground within the building is graded up eight or ten inches higher than that outside, and the surface is covered loosely with any old boards — discarded weather boarding is good—and then sand is hauled in to the depth



Ground Plan of Mr. Davis' Poultry House.
D, Droppings boards. R, R, Roosts.



Front Elevation of Mr. Davis' Poultry House.

glass surface. It is well to have a shutter of boards to close at night.

It is useless to have a whole glass front in order to make summer time in the house in January. To do this, the building must be kept tight, and, with foul air, hot and humid by day, and damp and cold at night, there will soon be work for the poultry undertaker.

No scratching sheds are thought necessary for poultry houses on the farm. The interior wire door is closed, and the outer door thrown open, and the house is turned into a scratching shed. Fresh air is thereby introduced into the house, and the dust which the industrious hens stir up has a tendency to discourage lice and mites on the house walls and fixtures, as well as on the fowls themselves.

Following is an estimate of cost of house as described 9 ft. x 12 ft.:

Sills, 4 x 5,	\$1 50
Studding, 2 x 2,	2 00
12 rafters, 2 x 4,	1 50
260 ft. siding,	8 00
500 ft. roofing and interior sheathing,	5 00
Windows,	2 50
Doors, etc.,	1 00
	— \$21 50

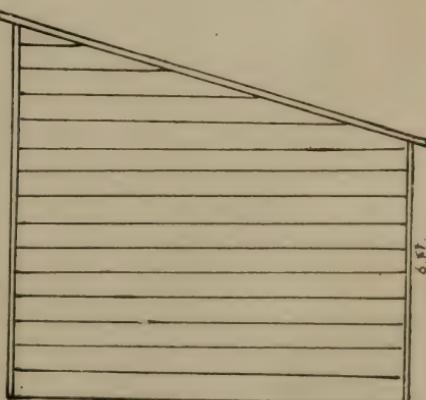
Let the reader consider this plan in the light of the two points Mr. Davis states as of most importance — dryness, and a smooth interior surface. He considers the double wall with air space between essential to a dry house, but it is probable that his houses of this type have been dry because well ventilated, rather than because of construction. We may reasonably infer from his last paragraph that he appreciates the value of fresh air in the poultry house, and takes the necessary means to have it there.

The proposition of the relation of construction to dryness in the house may be put in this way:—

A double walled house properly ventilated will keep dry.

of three inches. The floor is then always dry and warm, with a wallowing place, and grit always handy.

The plan of the southern front shows the arrangement of doors and window. The door is made of good width, so that wheelbarrow or cart can pass through when cleaning the house. From 12 to 16 sq. ft. of glass is sufficient for a house of this size. Too much glass is a mistake, as it makes the room overly hot in the daytime, and too cold at night, as the heat at night quickly passes out through a



End Elevation of Mr. Davis' Poultry House.

A double walled house not properly ventilated will not be dry, but will collect moisture on walls and ceiling just as a single walled house would under the same conditions.

The conclusion then is unavoidable that dryness in a house depends upon ventilation rather than upon the construction of the walls.

In this connection I may appropriately refer to the occasional practice of filling or partly filling the space above the level of the eaves, in a house with double pitch roof, with hay or straw lying on a floor with wide spaces between the boards. By this means the house is kept dry without being opened, but whether the requisite amount of pure air is introduced is doubtful. I am inclined to think that it is not, except in cases where the loft overhead is open, and in such cases it is open to question whether it would not be better to leave the hay out and ventilate through the lower windows and doors.

In connection with the use of building paper to line the building arises the question of its durability, and especially of the effect upon it of repeated whitewashings, and this is a question upon which we have no authoritative information available.

The only other points in connection with this plan seeming to call for comment are in regard to the method of making the floor, and the rated capacity of the house.

I do not know where the advantage comes in in putting a loose board floor over the filled floor before covering with sand. Generally speaking, it is better to have floors so constructed that they furnish no harbor, under boards or cement, for rats and mice. While I cannot show it to be true beyond a doubt I think that it will be found by those who take notice of the matter that, broadly speaking, poultrymen who use houses set right on ground that can be dug up if necessary are much less troubled with rats and mice than those who try to build to keep them out of the houses. In other words, the more practical way of dealing with such pests, as well as with lice, seems to be to so build the houses that it is easy to get at them in their harboring places.

While rated as having capacity for 25 fowls, this house, the dimensions of which are 9 x 12, giving a floor area of 108 sq. ft., is a little small for that number.



A Maine Poultryman's Favorite Poultry House.

J. C. Pattison, Kennebunk, Me.

In describing our ideas of the best plain poultry house for twenty-five fowls, we are giving practically the plans of a house which we have built and used a sufficient time to prove its worth. The house referred to, however, has two pens, and is used during the breeding season for breeders. In our description, therefore, we are describing to all intents and purposes one pen in this house.

Requirements.

What are the requisites of a good plain poultry house?

*Neatness and simplicity of design,
Economy and durability of construction,
Convenience of equipment,
Proper hygienic conditions,*

Would seem to cover the requirements, and we shall proceed to describe a house which embodies these requisites.

Specifications.

Single pitch roof—no sills or plates used.

Dimensions, 15 ft. long, 10½ ft. wide, 7 ft. high front, 5 ft. rear.

Openings, four six-light sash 10 x 14 in. glass. Door, 2½ x 5½ ft.

Sheathing, rough boards covered with sheathing and roofing paper.

Interior.—Roosting box 9 x 3 ft. Bank of nests 18 in. above floor. Hopper for grit and oyster shells. Shelf for water pan, feed box. Dirt floor.

Construction.

Roof.—In the low single roofed house we have the warmest construction obtainable at a minimum of expense in building, and overcome any objection that there may be on the score of poor ventilation by curtains in front of roosts and at certain windows.

Framing.—The studs are toe nailed directly to posts set into the ground 18 in., and projecting 6 in. above ground, and the rafters are nailed directly to top of studs, which are cut at the right level to fit them, thus doing away with sills and plates. This construction gives ample strength for buildings of this class. The front studs are spaced to take in the three windows shown in cut, Fig. 1, about 2 ft. 10 in. apart, which allows windows to slide vertically between studs. This also establishes the spacing of rafters and rear studs at 2 ft. 10 in.

Dimensions.—The ground dimensions, $15 \times 10\frac{1}{2}$ ft., gives a pen of sufficient size for twenty-five fowls, and lumber will cut to good advantage. The height, 7 ft. front, 5 ft. rear, is sufficient for doing the work, while contributing greatly to the warmth, and lessening the expense over higher studding.

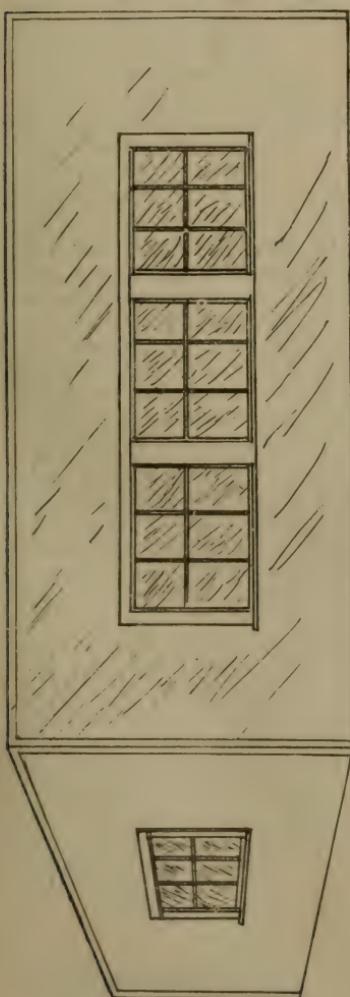
Windows.—Four six-light sash, three in front and one in opposite end to door, are sufficient

for light and ventilation. These are arranged to slide up and down readily, and should be open a part of each day. For these window spaces also we should have at least two frames same size as sash covered with cotton cloth to slip in in place of glass on stormy days, to give ventilation and keep out snow and rain. Sliding frames are preferable to those hinged at the top for window openings, as the latter catch dust when up, which excludes light. For our part we use no glass at all in our laying houses, (except in a house for breeders, and this only to protect combs of males), but rely on curtains entirely. In summer, with front and end windows out, and slat door, the house will cool perfectly on hottest nights.

Floor.—For almost all locations, or on practically all land suitable for fowls, a dirt floor is far superior to one of boards or other material. The building should be filled in several inches higher than ground outside, with fine dry dirt. A dirt floor furnishes the best possible absorbent for droppings, and contributes greatly to the health of the fowls—a dusting medium which the fowls may use at will—a good foundation for litter, and the labor of removing dirt and replacing with fresh each spring and fall, is less than keeping a board floor properly clean, to say nothing of the high fertilizing value of the dirt removed, which is fined up ready for use.

Covering.—The sheathing, being covered with paper, may be of unplaned lumber, if cheaper, and the bottom courses should be of hemlock, which will last longest when in contact with the earth. The sheathing runs lengthwise of the building; a sheathing paper is used to increase the warmth, and in laying work should be begun from the opposite end of building from that used in beginning to lay the roofing proper in order to break joints with the roofing and render the building warmer and more wind proof. A very good way to lay the paper is to run the strips from the ground or windows in front up over the roof and down to the ground in

Front and End of Mr. Garrison's Poultry House.



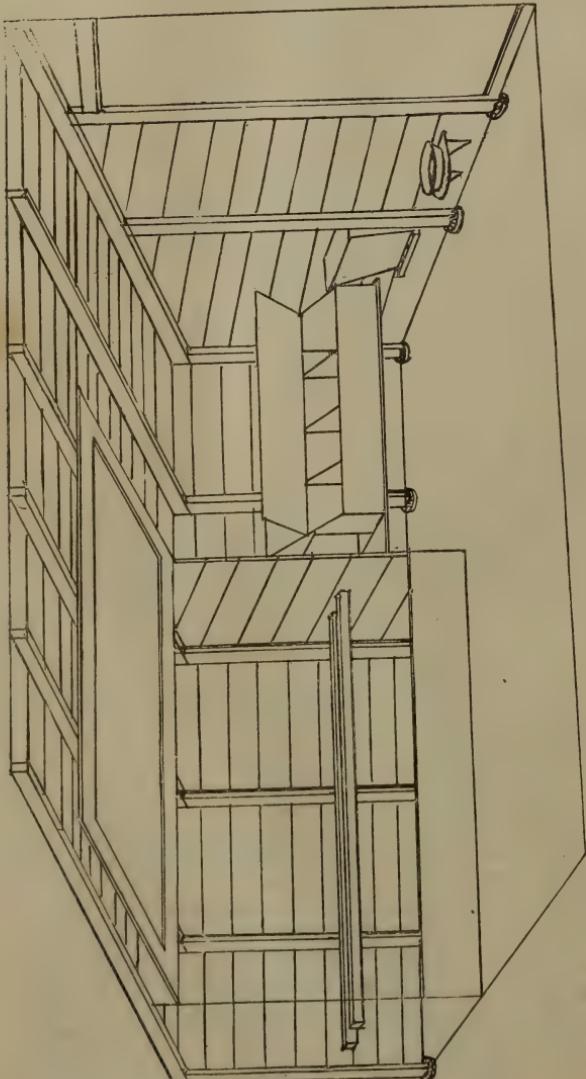
back in one piece, which saves material and insures tightness. Batten of $\frac{1}{2}$ in. pine laid two strips to a width of paper holds the covering better, although tins will do.

Interior.—In cut, Fig. 2, the interior arrangements are shown. The roosting box, with board 1 ft. high at bottom to keep litter on main floor, is 9 ft. x 3 ft., giving space for 18 ft. of roost, and has cloth covered frame hinged at top to let down in extreme weather and still permit fresh air to reach the fowls through cloth. The cut shows no droppings board, but merely the dirt floor at the bottom; this is by all odds the best arrangement, (we are using both methods, and know) doing away with the unsanitary board, an abomination as usually taken care of. A few shovelfuls of earth occasionally thrown in the bottom of this box will keep everything in good sanitary condition for several weeks without cleaning out.

Those who prefer the board, however, may put it in. Roosts are 2 x 3 in. scantlings, 18 in. from ground.

The nests shown in the cut are up off the floor showing floor space, and giving a secluded dark nest, which is an advantage when an egg eater develops; they are more easily reached by the attendant than the "soap box in the corner," although the latter is not to be despised. These nests are set upon a shelf run between the end of roost box and end of house 2 ft. wide, and 18 in. above floor. The cover, the lower half of which is hinged, should have slant enough to make it objectionable as a roosting place.

The hoppers for grit and oyster shells speak for themselves. For a feed box we prefer one made by using a board 10 in. wide by 2 ft. long with strips 6 in. wide nailed to its edges, the strips to be nailed from their centers, thus making in effect a box 3 in. deep whichever side is up. By simply turning it half over, a clean side presents itself. Mash may be poured from a pail into a box of these dimensions easier than into a V trough. In conclusion let us say that there is no condition met by a scratching shed house, or any other kind of house, that this house



properly used (and with plenty of scratching material) will not meet also. The windows are intended to be open every day in the year. If it snows, slip in the cloth covered frames described, but give the fowls fresh air at any and all times day and night through their curtains, and don't have a droppings board six inches from their noses.

Note:—Our healthiest and best layers last winter, when the thermometer went to 20° below zero on several occasions, were housed without using a single square of glass, just the two sets of curtains. If this be true in this latitude it should be in almost any.

Materials.

The following is a list of materials required, with prices:

3 pieces 2 x 4 22 ft. long for rafters, 44 sq. ft. makes 2 each.

8 pieces 2 x 3 10 ft. long for studs, 40 sq. ft. front and rear stud each.

84 sq. ft., @ \$20 M.,	\$1 68
16 cedar posts, 2 ft. long,	.75
500 sq. ft. 12 ft. boards, \$17 M.,	8 50
4 windows, 6 light 10 x 14 glass, 60c. each,	2 40
Nails, hinges, etc.,	.90
1 roll sheathing paper, 500 sq. ft.,	1 00
1 roll red rope roofing paper, 500 sq. ft.,	5 00
<hr/>	
Total,	\$20 23



In the matter of roofing material opinions differ widely; some would prefer to use a more expensive material than the above. In that case a lighter weight can be used for the sides than for roof, which will effect a saving in the class of material referred to, which runs from \$1.75 for one-half ply to \$3.25 for four ply per square of 100 ft. The red rope, however, will last several years, properly laid, and if painted will last longer.

We have then a house for 25 fowls costing little more than \$20 for material, which is "good enough" for the purpose, and fulfills all the requisites cited in the beginning of this article.



My first criticism on this house plan would be as to dimensions of the floor. If we admit as correct the proposition laid down in Lesson VIII., that the floor should be as nearly square as possible, the house 10 ft. wide by 15 ft. long is getting a little too far away from our standard.

Under some circumstances I would criticise the form of the roof, but in a house as narrow as this the objections which may sometimes be made to a single pitched roof with northern exposure lose much of their force; and though observation of houses I used myself has seemed to indicate to me that as a general rule a double pitch roof was more satisfactory, I would not care to dogmatize on that point, and have my judgment on it judged by the experiences of others, because points like that are difficult to determine beyond doubt.

One thing, however, should be emphasized: Whoever adopts this plan must consider the effect before making changes in the dimensions. Mr. Pattison figured out dimensions that keep him clear of faults which would be pronounced in a house of the same style with some other dimensions. If such a house is made 12 ft. wide, the front wall must be higher, or the rear wall lower, or both, and the rafters for a single stretch of roof become longer than is advisable for a roof with no supports under it.

The enclosed roosting box I would consider unnecessary, except perhaps to protect large combs, and I am not sure that it is necessary for that for fowls that are thoroughly rugged.



Another Maine Poultry House.

Martin Ryan, Baring, Me.

Although in this plan there may be nothing new, for a plain substantial poultry house that is warm, dry, and light, there is nothing better. The plan is for a house 12 x 16 ft., but it can be

built any length. The house is 4 ft. high at back, as low at side, and $6\frac{1}{2}$ ft. at front side, with long and short pitched roof. It is plenty high enough for a man to stand inside back as far as the droppings board without stooping.

The house rests on ten cedar posts that are set in the ground three feet, and extend above the ground eight inches. One post goes to each corner; two at equal distances apart under the front and back sills, and one under the center of each end sill. The posts are lined off level at top, and the 4×4 sills spiked on top of the posts. The frame is 2×4 spruce. The studs and rafters are two feet apart, and the house is boarded tight down to the ground with rough boards, and roof, ends, and sides covered outside the boarding with good sheathing paper, and shingled with cedar shingles laid five inches to the weather.

Inside between the sills is filled in with small stone to the depth of six or eight inches, and covered with gravel or sand level with top of sills; this will bring the floor up enough so it will be perfectly dry, and the fowls will always have a dust bath in the sand and gravel of the floor.

The high side of the house should face the south or southwest, and have two windows fifteen lights each of 8×10 glass. The windows are hung on hinges, and swing inside, and when these windows are swung open on bright sunny days the house is turned into a partial open scratching shed. The house can be divided with wire partition and frame door covered with wire hung on spring hinges. This will give two pens that are very convenient if more than one variety is kept, or when sorting fowls for breeding.

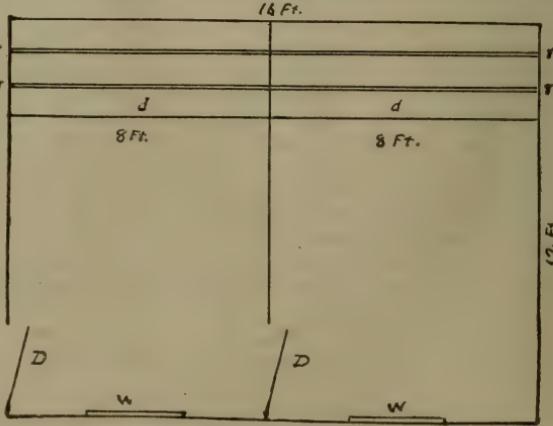
The roosts are at the low side of the house. The droppings boards are put up two feet from the sill, and the cleats that the roosts rest upon are six inches higher than the droppings boards. The roosts are 2×4 , the length of each pen, two roosts to a pen. They are ten inches from the wall and fifteen inches apart. The droppings boards are three feet wide.

The nests are under the droppings boards, and are 14×14 inches wide by 12 inches deep; they fit up against the droppings boards, leaving a space of one foot under them so the fowls have the entire floor to roam and scratch in. These nests are not nailed in place, but slide in on cleats; they are made in one long box divided in four nests, each with a four inch board at back to hold the straw that the nests are made of. The front of the nest is a four and an eighth inch board. The wide board is hinged and drops down so the eggs can be gathered from the front. The back of the nest is provided with a four inch board for the hens to step upon when entering the nest. These nests are retired and dark enough so there is no danger of egg eating.

The wall back of the roost from the droppings board up to plate, and the roof up to a line even with the outer edge of droppings boards is double boarded and stuffed with dry sawdust.

My house that is built on this plan is forty feet long, and I find it just the thing. I like it better every year; better than any other house that I have yet seen. There is no space taken up for walk or nests. The house is built for hens, and the entire floor space is given to them.

With the short and long roof you get a house high enough to work in without danger of head bumps; while with the single pitched roof the walls would have to be much higher to get the same room at low side of house, and, therefore, much colder. The high side of this house faces the south, giving room for high windows, and giving larger area of building the benefit of the sun in the short winter days when it is so much needed. In my house the windows are open every day, except when the snow blows in, and I am never troubled with colds or roup among my



Ground Plan of Mr. Ryan's House.
D, door, W, window, d, dropping boards, r, r, roosts.

hens. They are as healthy and vigorous a lot of fowls as you can find anywhere. I keep the floor well covered with litter in which I scatter grain, and the fowls will scratch and dig and sing all day long as happy and contented as if they were in my wife's flower beds in June.

This house I would rate as having a capacity of 12 hens to a pen, in all 24 hens. At a pinch it might be used for a few more, but with the droppings boards extending 3 ft. from the north wall, and the nests under them the floor space for use in the house is hardly more than 8 x 9 ft., or 72 sq. ft.

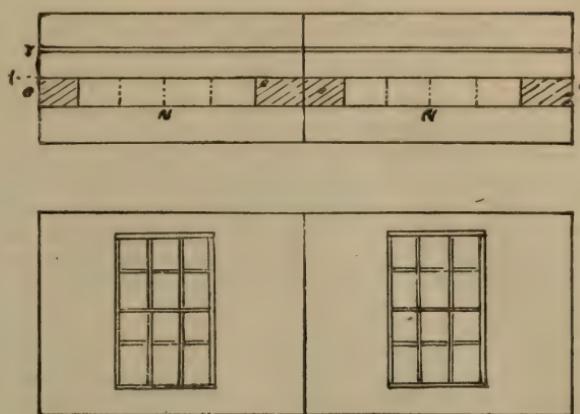
Bill of Lumber.

Sills, 2 pieces 4 x 4, 16 ft. long.	
Sills, 2 pieces 4 x 4, 12 ft. long.	
Studding, 9 pieces, 2 x 4, 6 ft. 4 in. long.	
Studding, 9 pieces, 2 x 4, 3 ft. 10 in. long.	
Plates, 2 pieces, 2 x 4, 16 ft. long.	
Rafters, 9 pieces, 2 x 4, 9 ft. 6 in. long.	
Rafters, 9 pieces, 2 x 4, 4 ft. 6 in. long.	
Collar beams, 9 pieces, 1 x 4, 6 ft. long.	
End and partition studs, 4 pieces, 2 x 4, 8 ft. long.	
In all—320 ft. of spruce for frame, @ \$14	\$4 48
Ten cedar posts 3 ft. 8 in. long, 4 in. at top.	
550 sq. ft. of hemlock boards, @ \$10 per M.,	5 50
150 sq. ft. of matched boards, @ \$16 per M.,	2 40
30 sq. ft. of furring 4 in. wide, @ \$14 per M.,	42
40 sq. ft. of furring 5 in. wide, @ \$14 per M.,	56
5 M. shingles, @ \$1.50 per M.,	7 50
30 lbs. of nails, @ 4c. per lb.,	1 20
3 rolls of sheathing paper, @ 50c. per roll,	1 50
10 cedar posts, @ 5c. each,	50
Hinges and latch,	50
	—
	\$24 56

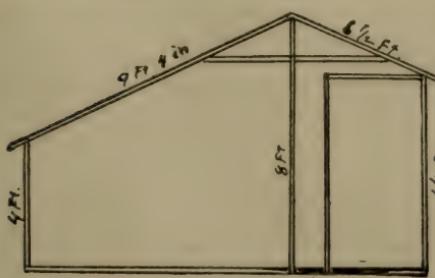
These are the prices that rule in this vicinity.

While not disposed to quarrel with those who use and prefer them, the arrangement of nests under droppings boards never suited me, even when I used droppings boards in the poultry houses. The nest arrangement I like best for laying hens is an open nest to hang on the wall. This will be described in connection with other nests in a subsequent lesson.

As the reader may infer from a comparison of this with my own plans, the packed wall and roof back of and above the fowls is a feature I consider unnecessary. During this last winter I have had one pen of hens that had a shed full of leaves back of it, but I could not see that they were better off than the hens that had but one thickness of boards.



* Outside Front and Inside Back of Mr. Ryan's Poultry House.
N, nests, e, entrance to nests, d, droppings boards, r r, roosts.



Cross Section of Mr. Ryan's Poultry House.

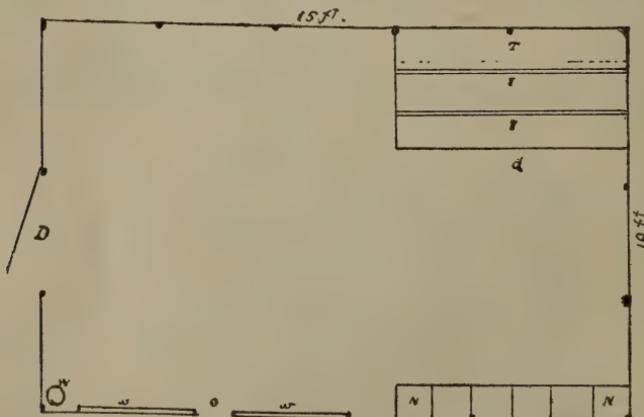
A House With Single Pitched Roof Sloping South.

E. A. O'Brien, South Dennis, Mass.

This is a 10 x 15 ft. house; 7 ft. back; 4 ft. front, facing south. The claim for this house is a combination laying house and scratching shed. Its capacity is twenty hens.

There are two windows $3\frac{1}{2}$ x 4 ft. in front, which are hinged at top, and opening inward, held up by a hook from roof, wire netting on outside of casing, so that in all stormy days these windows can be opened, and the fowls have plenty of good fresh air with no drafts. These windows are placed at the west end of the front of the house, one foot apart, leaving a space of six feet at the east end for laying and roosting room not partitioned off.

The droppings board is 3 x 6 ft., and on hinges which can be made at any blacksmith's shop — a four inch eye threaded — which is screwed into the corner upright, and into another upright six feet away; the hinge is made with an "L" to fit the eye, rounded. The roosts are made of three inch furring — two pieces 6 ft. long, 14 in. apart, and two pieces $2\frac{1}{2}$ ft. long — and put on hinges the same as the droppings board, and attached to the same uprights, only 8 in. above droppings board, which is one foot above the lower stringer.



Ground Plan of Mr. O'Brien's Poultry House.

D, door; o, small door; w, window; d, droppings board; r r, roosts; T, trough for droppings; w, water vessel.

A flat trough, 10 in. wide and 6 ft. long, with 4 in. ends and sides, is placed between the two uprights close to the wall; this trough catches all the droppings as the droppings board is raised up to the back wall and hooked up out of the way. With the hinges made as above mentioned, the roosts and droppings board can be unhinged without any trouble, and taken out and cleaned.

When going through the house mornings to feed, it is a matter of but a minute to raise roosts and droppings board, droppings falling into trough below; then when feeding at night let them down again and sprinkle a little slaked lime or ashes — just dust — which absorbs the moisture from droppings, and they roll off when the board is raised; trough may be cleaned once a week. Push wheelbarrow into house, and as the trough is wide enough to admit a shovel, it takes but few minutes to clean it out, again using a sprinkling of lime or ashes.

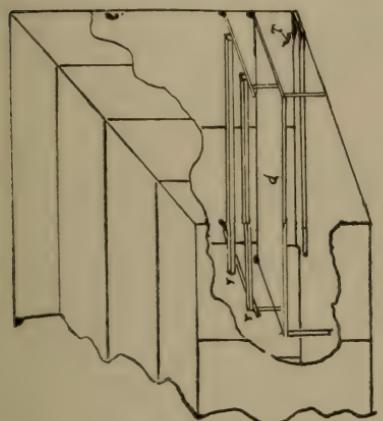
The arrangement of roosts and droppings boards gives the whole house for a scratching shed. Put in a foot of litter; throw grain in litter, and hens will do the rest.

On extremely cold nights a curtain of burlap can be made very cheaply and dropped from roof to about six feet above the droppings board; the burlap is better than cotton or duck, as it is so loosely woven that it does not make a hot house of the roosts, but allows a free circulation of air, and yet gives the needed warmth.

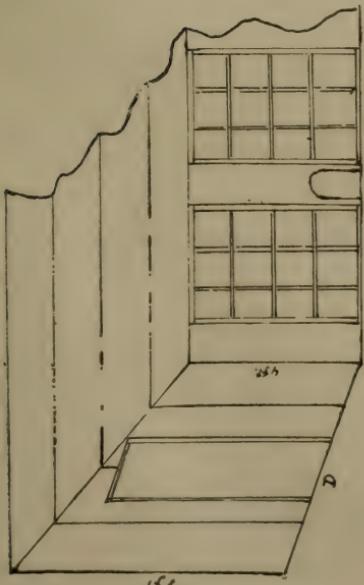
The material used in building this house is as follows:—

- 5 sticks, 2 x 4 — 15 ft. long for stringers.
- 15 sticks, 2 x 4 — 12 ft. long for roof, front and back uprights.
- 450 feet hemlock boards.
- 1 roll Neponset red roof paper.
- 2 sash, 3 $\frac{1}{2}$ x 4 ft.
- 3 pair strap hinges for door and windows.
- 2 pair hinges and eyes for roosts and droppings board.
- 5 hooks for door, windows, roosts, droppings board.
- 1 bundle laths for cleats for roof.

The price for material differs so much in different localities that I will not give prices, but this house, with lumber at \$18 per 1,000 ft., should and can be built for less than \$25.



Mr. O'Brien's Poultry House.



Mr. O'Brien's Poultry House.
D, door; a, small door; b, droppings board; c, roosts.

As in the case of Mr. Pattison's house, we have here a plan in which the dimensions minimize what I call faults in the style of the house. In a house with the front only 4 ft. high, the sun does not get into the house as it does with higher windows, while the whole roof and front being exposed to the south, such a house, unless very carefully ventilated, warms up too much during the middle of the day, and cools too quickly after the sun goes down.

Though I would not recommend this style of roof for a house built where any style of roof might be used, there are times when it is the best style — as when a poultry house is to be built as a lean-to beside another building.

In a house of this style and dimensions, I think it would be found an advantage to put windows in the ends as well as in the front. The light would be better, and the ventilation through the windows could be better worked to offset the faults of this style of roof.

The roosting arrangement is one that will appeal to many.

A Neat House With Labor Cost Given.

A. T. Grosvenor, Abington, Conn.

Last year I wintered three pens of hens in houses constructed similar to the accompanying plan. This plan, however, in order to accommodate twenty-five hens, is two feet longer and one foot wider than the plan of the house now in use. The pitch of the roof on each house is the same, consequently the larger building is somewhat higher.

In regard to the construction, the sills are 3 x 4 in. pieces, while the posts, plates, rafters, etc., are all 2 x 3 in. The frame is covered with ploughed and matched pine, or barn boards only. The roof is shingled, with no attempt to have the roof boards fit closely; in fact, on the

four houses which I have, the roof boards are nearly two inches apart. The eight inch jet is of course unnecessary, but I think it adds considerable to the appearance.

For light there are two windows with double sashes, each sash having two 12 x 16 inch panes. One or both of these windows is opened a part of each day, the time determined by the temperature and condition of the weather. The floor of each pen is sand and gravel.

Materials and Labor.

FRAME.

Sills,	{	2 pieces 3 x 4 in. 12 ft. long, 24 sq. ft.
		1 piece 3 x 4 in. 16 ft. long, 16 sq. ft.
		3 pieces 2 x 3 in. 16 ft. long, 24 sq. ft.
		16 pieces 2 x 3 in. 12 ft. long, 96 sq. ft.

\$22.50 per M.,	160 sq. ft.	\$3 60
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BOARDS, ETC.

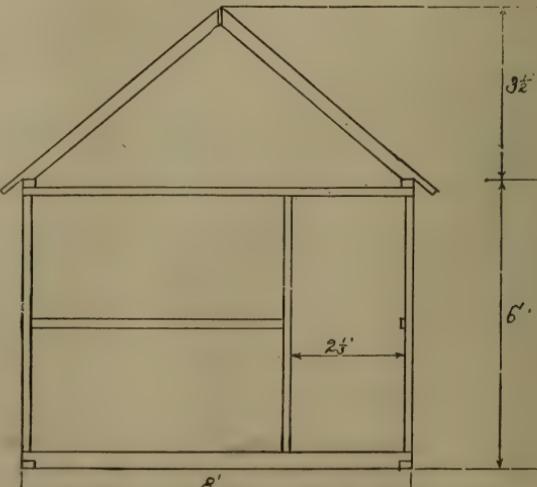
154 sq. ft. roof boards, 14 ft. long, @ \$20 per M.,	3 08
192 sq. ft. barn boards, 16 ft. long, @ \$30 per M.,	5 76
168 sq. ft. barn boards, 12 ft. long,	5 04
9 pieces square edge pine, 4 in. wide, 12 ft. long, @ \$30 per M.,	1 08
3 pieces square edge pine, 4 in. wide, 14 ft. long,	42
1250 shingles, @ \$4 per M.,	5 00
2 windows,	2 20
Nails, hinges, thumb latch, etc.,	1 00
Labor,	7 50

Total,	\$34 68
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In this plan we get away, a little, from the severely plain and simple construction of the other plans given, and get a building somewhat more slightly, a point which sometimes has to be considered if a poultry house is so placed with reference to other buildings that an extremely plain one would mar the general effect.

The one point which seems to me especially to call for criticism is the leaving a space between the sheathing on the roof. Most of my houses are built that way, but I would not build another without laying the roof sheathing close. The increase of cost is comparatively trifling, and the gain in looks, and a smooth surface to whitewash is considerable.

As with some of the other plans given, the capacity of this house is rated rather high. Twenty-five hens may be kept in it in winter, but twenty is nearer right, and the latter number is the safer one to use.



Diagrams Showing Ground Plan and Scale, 4-Inch

Which Plan?

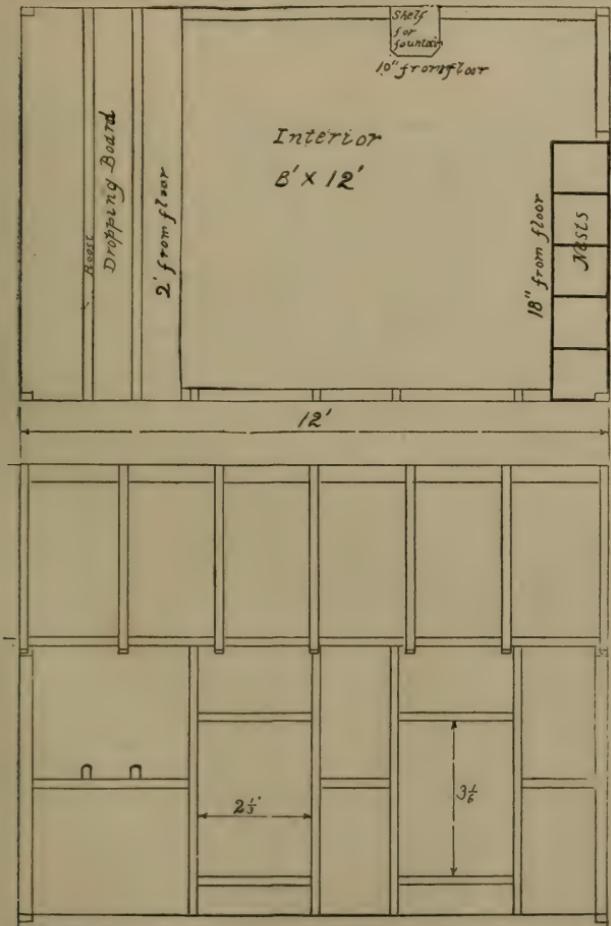
In the above plans, and the two given in the last lesson, readers have been furnished plans for seven plain, good, and cheap poultry houses at low to moderate cost.

While I have made some criticisms on the plans in this lesson, and also indicated some faults in construction of the houses I built, I want to impress it on those studying these lessons, and about to decide what style of house to build, that—considered from the standpoint of practical work—the faults of these plans are what we may term secondary faults. There is nothing in any of them, that I can discover, that would make it possible for one using such a house to attribute poor results to the house.

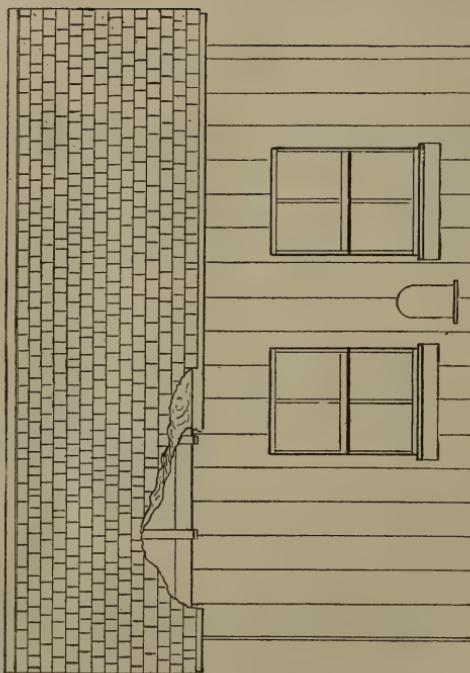
The matter of the adaptability of these different plans to different conditions, and especially to other climates, will seem to many to call for consideration. Many suppose— and not unnaturally—that a house suited to New England conditions would not suit conditions in Virginia, Maryland, Florida, or Texas.

The more substantially and warmly built houses used in northern states go beyond what

southern conditions require in construction. That they also go beyond what northern conditions require, a great many of us believe, and are proving our faith by the style of buildings we use. But a warm, tight house with small openings which might work satisfactorily in the north—except in occasional sultry weather, would be unsatisfactory in a warm climate. For such a climate an open shed house, such as those I am using, is much better. However, from my own experience with houses of different styles in Colorado, where I have seen colder weather than in the vicinity of Boston, much warmer weather than we ever have here, and more sudden changes than I have seen here, I feel safe in recommending such houses as I now use for any place where shelter is required. As slight in construction as they can be made and have them stand up and stay together, they still provide protection from storms of all kinds. The experience of many poultrymen in different sections is confirming this judgment.



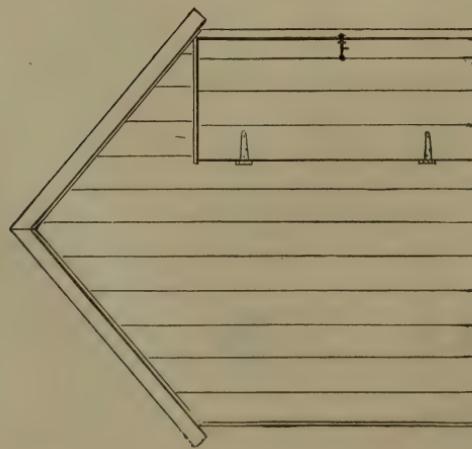
Framing of Mr. Grosvenor's House.
to the foot.



South side

Exterior of Mr. Grosvenor's Poultry House.
Scale $\frac{1}{4}$ inch to the foot.

East End



LESSON XI.

Summer Management of Fowls.

THIS subject naturally divides into two topics:

- 1.—*What fowls to keep.*
- 2.—*How to handle them to best advantage.*

Both of these topics have to be considered with reference to future as well as immediate results.

Old Hens as Layers.

In connection with the question of keeping over for another year the hens now from a year to fifteen or sixteen months old, arises the old question of the relative value of pullets and hens as egg producers, a question which has provoked as much controversy and as much needless and pointless wrangling as any of the many questions each swiftly passing generation of beginners in poultry culture has to solve anew for itself.

The first cause of all this trouble is in the statement of the proposition — in the attempt to make an arbitrary division of fowls into profitable and unprofitable producers, and make the line of separation at a certain age.

I think it may be truly said that in no matter relating to poultry (or to anything else, but we have to do only with poultry here), is it possible to make arbitrary and sharp divisions and distinctions for certain alleged purposes, and have results as they come justify the rules upon which the divisions were made. There is no best breed of fowls. There is no best method of feeding or housing. We are many men of many minds, working under many different circumstances, with stocks of fowls that have experienced many different conditions. So we cannot all use the same rules, nor will any of us be wise to make hard and fast rules to govern in the conduct of our business.

To get back to the main point. In the discussion of question of the relative laying qualities of hens and pullets, the fowls are generally classed according to age at the beginning of the period for which results are to be compared, and considered as in that class throughout the entire period, though, as a matter of fact, the pullets may pass the pullet age at some time within it. Properly designated, a pullet is a hen less than a year old.

The period for which results are usually compared is from the time the first pullets begin to lay — generally October or November — until the next spring or early summer. Hence, in such comparisons, no account, as a rule, is taken of the performance of the hen during summer and early fall, though it must be evident to every one that in considering the question at this season, (July 1st), we must consider what we may get out of the hens in the four months or so before the pullets are laying, as well as what we may get in the winter and spring.

Some authorities advise and some poultrymen make a practice of disposing of laying stock

In the fall when the hens that were pullets in the preceding winter are sixteen to eighteen months old. I think it is much the better way to give the old stock a general overhauling before extreme warm weather comes on, and arrange at that time for the most profitable disposition of each of the several lots into which the flock will be divided. When the general clean up is to be made in the fall the tendency is to leave in the flock many hens which should be disposed of without delay, the reason the poultryman gives himself for this being that, as the bulk of the lot is to be disposed of at that future time, it makes little difference if the few unprofitables are allowed to remain in it. Consequently some proportion of the fowls in each pen or flock are non-producers, adding nothing to the income, while consuming their share of the food, occupying room, taking time and attention of the poultryman, and, last but not least, adding to his risks of loss, for the idle unproductive fowl at this season more, perhaps, than at any other, is detrimental to the flock.

So it seems to me that the numerous beginners, and others young in the business, who are on their own initiative making preparations to cull their hens, now show a much better appreciation of the best policy than do those of longer experience who leave this culling until the summer is over.

As I come in contact, personally and through correspondence, with the experiences of a great many poultry keepers each year, it seems to me that it is still true as it was in the traditional times prior to the improvement of breeds and of methods of poultry culture, that most hens lay well for only a few months in the spring. It seems, also, to be the fact that a great many poultrymen who get fair to good egg yields in winter and spring get very poor yields after the warm weather comes on. In this fact we may find one reason for their preference for pullets for laying purposes, and for their failure to reckon summer and fall as profitable seasons in egg production.

Certainly it does not pay to keep hens over if they are idle for a period of five, six, or seven months; but, if we can have our hens giving fair to good egg yields through summer and fall, and have them idle, or nearly so, for but two or three months, that is the better way to manage. The question is: Can it be done, and how?

Selecting Hens to Keep Over.

Let me state first of all that it cannot be done with all hens. In every flock of yearling hens there are some it will not pay to carry over — hens that even at this age have outlived their usefulness. The proportion of such hens will depend on the vitality of the stock, on its general condition and performance through the winter, and on how well the poultry keeper has succeeded in adjusting food and care to maintaining the hens in condition for future productiveness.

If as the poultry keeper reviews his experiences of the past year he recalls any of the following things as circumstances in the history of his flock of yearling hens, he is warranted in considering that an unusually large proportion of them are not good candidates to keep over:—

1. *If they were not thrifty as young chicks.*
2. *If at any period of growth they were checked.*
3. *If there was at any time during the year any serious sickness epidemic among them.*
4. *If they were spasmodic layers.*
5. *If after a period of good laying they suddenly fell off and were hard to get laying again.*
6. *If they are now generally in poor condition.*

A lot of hens may have had all these unfortunate experiences; few flocks entirely escape them, and most poultrymen have to take account of some of them every year. The years when we avoid them all are red letter years in our lives, and the hens produced in those years are likely to be unusually long lived as profitable layers.

Now, though in proportion as they have escaped the above ills, the yearling hens are more promising candidates for a longer stay in the poultry yard, we must not make the mistake of condemning them on one or two counts, especially if the faults were remedied; but we must note that every unfavorable condition in the life of the hen increases the danger that as she passes her prime she will develop digestive or ovarian troubles, and with this in mind we must

select much more carefully from such a lot of hens than from a flock that has had no trouble and has been steadily productive, and always in dealing with an individual of such history must consider that its expectation of continued productiveness or of recovery from disease is below the average. In deciding upon his general arrangements for the year, the poultry keeper who has to deal with a flock like this can estimate that he will have only a small proportion of yearling hens to carry over.

In selecting from a flock of yearlings that have been generally in good condition, free from disease, and fair to good egg producers, take first those that are plainly in good health and condition, bright looking and presumed to be laying or about to lay. Hens that answer that description at this season of the year we may say quite positively that it will pay to keep over.

Of course this does not mean that every such hen will be profitable. Every hen of a small lot may be, but the rule is that as hens advance in age an increasing proportion of them develop disorders or from various reasons become unprofitable. What we say of this selected lot of yearling hens is that being at this season in fine condition these hens may be reserved and given regular care with every reasonable assurance that they will give a good account of themselves, and their further culling need not concern the poultryman for some time.

Having taken out the best hens, take now the worst ones — the hens that are noticeably inferior in size and appearance. Perhaps I can make it plainer by telling how I go about it myself.

When putting pullets into winter quarters in the fall, as long as I have room for them, I do not reject slightly undersized or those that lack typical shape, provided they seem vigorous and healthy. My experience has been that while not equal to well grown and well built pullets for continued egg production these inferior pullets are generally profitable as layers through their first winter and spring laying period. After that I find them as a rule less satisfactory, and except in case I reserve some for further tests, all such yearling hens go to the hen cart in the first general clean up in June or early July. When I was handling poultry on a larger scale, and peddling out my products, we were killing off old stock as customers wanted it every week in the year, yet always as the young chicks came up and needed the room we found it necessary to go over the whole stock carefully and dispose of many of the least promising yearlings.

These poorest hens are destined to go to the hen cart as soon as in marketable condition, whether they begin to lay or not.

We have left now some hens about which we are uncertain. They do not seem to belong positively with either of the other classes. Most of them are good hens in poor condition.

That being the case, the points for us to consider are why they are in poor condition, and whether their condition can be readily improved.

The most common cause for healthy hens being in poor condition at this season is that egg production for some time has been so heavy that they could not keep it up and keep in good flesh at the same time. The result is that they lay heavily as long as they can stand it, then have to stop, and will either not lay or lay only occasionally until restored to good condition.

My hens are at all times full fed and with sufficient variety, yet I always find a considerable number of them that thus lay themselves out of condition. The lot of hens comprising this class, if put by themselves, as I put them now, generally give, for awhile, a very small egg yield, though if one has been very rigid in selection of his first class hens, he will have left for this some that are laying, but not in good condition, and only more attractive than the others which go into the intermediate class because the comb is bright. If these laying hens go as they should into this intermediate lot we are likely to have from it at the start a low, but steady egg yield.

The hens are now divided into three lots, i. e.:

Lot 1.—Good hens in good condition.

Lot 2.—Good hens in poor condition, and hens about which the keeper feels uncertain.

Lot 3.—Poor hens and those which for other reasons it is not desirable to keep.

Under this last specification include scaly legged hens — no matter how good in other respects.

Lot 1 is to be kept over, and is to have the regular summer care to be described.

Lot 2 is to have special care and feeding to bring as many as may be into good condition, then be sorted out again, those which respond quickly to good care being transferred to Lot 1, or given the same care where they are, while those that do not get into condition with reasonable promptitude are to be marketed.

With regard to these last, and also to hens in Lot 3, if they do not flesh up readily, though apparently healthy, sell them as they are for what they will bring. Don't try to fatten them regardless of time or cost. The probability is that such hens have weak digestion, or some minor disorder that prevents getting them in good flesh, and if the attempt is made to force them pronounced disease may develop and make them a total loss. There is a market for poor fowls, but not for sick ones.

We will refer again to points in the handling of these lots of fowls after the general statement of the method of caring for fowls in summer.

The Season and the Systems.

Allusion has been made to the fact that many poultrymen who get fair to good egg yields in winter and spring do not do so well in summer. There may be other special reasons for this in special cases, but I think the prime reason is to be found in that the hens are kept under conditions that were made for winter, and cannot be properly adapted to summer poultry keeping.

Ventilation in the Poultry House.

Many poultry houses are so constructed that they cannot be thoroughly ventilated. Many that might be well ventilated by leaving all doors and windows open day and night are but partly opened in the day time, and almost closed at night. Houses with the roosts next low rear walls, and houses with deep narrow pens give very unsatisfactory conditions on hot sultry nights. In cool summers hens may do fairly well in such houses, but in hot seasons the lack of air in such quarters is very debilitating. A summer poultry house should be airy day and night; it must be so if the fowls are to do well and keep well in it. The Rhode Island colony poultry farmers block their houses up several inches from the ground in summer, admitting fresh air all around. If thorough ventilation cannot be obtained any other way, make openings in the rear wall of the house near the roof, with a slide or hinged cover that can be closed when rain or wind would beat in. There is, however, little danger of bad effects from such causes if the opening is protected by the eaves of the house; and there are few times in summer when one need fear lest fowls suffer from drafts through such openings.

Yards and Range.

Fowls keep in best condition in summer if they have good grassy range, with both sun and shade as they may want to take them.

They can, as a rule, be made more productive if confined to yards where the supply of green food does not exceed their actual needs, and fed well on a ration differing but little from that given during cool weather.

The most productive fowl, however, is not always the most profitable fowl. The item of labor must be considered, and the more yard room fowls are given the less close attention to their wants is necessary. No rule to govern the adjustment of labor to production can be given. It must vary under different circumstances.

If a man has nothing to do but take care of his fowls, or has ample time to give them all the care required under intensive methods, his best policy is to get the largest possible product from his hens.

If in the use of intensive methods, he gives time to poultry that otherwise would be devoted to other profitable work, he must decide just what division of his time will pay him best. Such decision requires some experience and some experiment in adjusting methods to circumstances. The essential thing in the early stages of one's work with poultry is to understand the need and advantage of striking the right balance in the distribution of time to different kinds of work, and direct one's effort toward the gradual solution of the problem.

Consideration must also be given to the fact that, though by confinement and high feeding, hens may, as a rule, be made more productive than when given more liberty and lighter diet, the process wears them out faster, and it is not advisable to force in this way hens that are to be used the next season for breeding purposes, or indeed hens that are wanted to lay during the succeeding winter and spring. High feeding through summer should be carried to the limit only with hens that are destined to be sold as soon as they cease to lay profitably. With those we want to produce longer we must be more moderate, and must modify the diet, even at cost of reduction in the egg yield, during extreme hot weather.

The Effects of Change.

Another point to be considered is that a change of quarters or a change from one system to a quite different one, with perhaps, changes in diet or method of feeding with the changing conditions, will at the same time better the condition and the egg yield of fowls.

Again and again poultrymen have taken breeding hens after months of heavy laying in confinement, put them on range to recuperate, not caring whether the hens laid or not, and found that after a little rest they began to lay, and laid well for a long time, when if left in their old quarters they would probably have done nothing. Good laying under such conditions does not seem to take as much out of the fowls as the same production in confinement. Such a change is not a sure way of making hens lay in summer, but it seems to do so often enough to make it worth a trial when other methods fail.

Summer Feeding.

Except for extremely hot periods or conditions which give hot effects continuously—as small yards and badly ventilated houses—the general summer and winter rations for laying stock may be virtually the same.

Using such rations as are given in Lesson I. for moderate winter weather, increase the corn meal and corn in them for extreme cold winter weather, and for summer reduce the corn meal and (especially) the corn in warmest weather.

In the last two or three seasons I have had more trouble with cracked corn than in all my previous experience, finding it difficult to get cracked corn free from mold. Consequently I have fed less cracked corn than formerly, and sometimes have omitted it altogether for weeks at a time. Good clean cracked corn free from mold and not heated may be fed to hens on range or in large grass yards quite as freely now as in winter, except in hottest weather, when it is advisable to leave it out.

Green Food.

Ordinarily fowls may be allowed all the green food they will eat, both winter and summer. Sometimes, however, when the weather is extremely hot they will, if liberally supplied with green food, fill up on it and take too little grain to sustain egg production at their usual mark. If egg production is to be maintained, if possible it is best at such times to feed green food only after the fowls have been fed on grain.

Again, fowls on a range well supplied with grass and insects are apt to get in the habit of foraging early, maintaining themselves on insects and grass, and lay very little. The best way to do in such cases is to keep the hens up until they have had one good feed of grain. If practicable the end sought may be gained by increasing the number of fowls on the range, thus making the supply of food each secures by foraging enough less than a comfortable sufficiency to keep it ready to take a fair ration of grain once or twice a day.

Animal Food.

A range must be very good indeed to furnish all the animal food they need to what fowls can get all the green food they need on it. Hence under ordinary conditions it is more necessary to supplement the animal food of hens on range than to provide special supplies of green food, and I think hens on range in summer will stand even heavier feeding of concentrated, prepared meat foods than when confined in winter. For hens that are closely confined it is safer to reduce the proportions of prepared animal food, and if it is desired to feed meat heavily feed at least a part of fresh meat or green cut bone, which contain large percentages of water. In feeding concentrated animal foods at this season special attention should be given to the

quality of the articles used. Anything of this kind that is not sound, sweet and good will produce bad effects more quickly in hot weather than at any other time.

Manner and Times of Feeding.

Whatever may be said of dry feeding for winter, and close confinement, it must be admitted that for hens on range in summer it is a method economical of time, and saving the poultryman from the necessity of giving close attention to every feeding, for when grain for a day, or two if need be, can be broadcasted over a range where it scatters enough to give the fowls all needed exercise in getting it, the task of feeding becomes light.

In more restricted quarters the amount which may be thrown out at one time is smaller, and when we get down to small yards, times and ways of feeding differ from the winter practice only in that the days being long it is much easier to make a satisfactory adjustment of the regular meals.

One of the great difficulties in winter feeding is to give the fowls in those shortest days enough for their own maintenance and good egg production, and yet not overwork the digestive organs. In summer, with it possible to feed in the morning several hours earlier, and in the evening several hours later, there is time for three full meals, and rests for the digestive system between them. That is why fowls often eat more in summer than in winter, and why when they do they stand heavy work better.

Perhaps the poultry keeper does not want to get up early enough in the morning to give his fowls an early breakfast. If so, he should see that they have something left over from the night feed to give them an inducement to be busy until he is ready to give them their breakfast. In very hot weather—indeed at all times in summer, but especially in very hot weather, the fowls should get out as soon as it is light, so that they may have opportunity to feed and exercise while it is cool and comfortable. When the heat is great they will keep still and go without food rather than make any effort to get it, and when they do this we see the same result as when they eat too liberally of green food to the neglect of the more substantial grain diet needed to sustain egg production. As my poultry houses are never closed, the hens get out as soon as it is light. Where houses must be closed for safety the poultry keeper should be about early and let the hens out. If he isn't willing to do that I should not expect to find him enthusiastic over summer eggs.

The comment just made suggests a word in regard to attention to fowls in summer. There is little doubt in my mind that many instances of poor summer laying are due to lack of attention to the needs of the hens. Too often the poultryman's interests at this season are centered on the coming generation of chicks to the neglect of the old fowls. When this is the case there is generally mismanagement somewhere. It may be that there is not room to carry both. In that case the stock should be reduced to what he has facilities to handle to good advantage. There is never a gain, and nearly always there is a loss, in overstocking a poultry plant.

Special Feeding.

Let us take up now the special feeding of such hens as we have designated as Lot 2 and Lot 3.

Lot 2 contains hens which are probably to be kept over, and therefore should be given care and feeding that would build up the general condition of the hens, as well as cause them to put on flesh. So while being in all other respects treated like the hens in Lot 1, they should be fed heavily as long as the appetite seems good. Give them a good rich mash, and enough of it so that they will leave a little over, which, within an hour or so, they will come back and clean up. Have grain where they can get it by foraging, or scratching at any time through the day. Then, just before dark, give grain in troughs, or what mash they will eat up quickly. If a second mash is used at night, do not continue it too long, or it may produce indigestion. If fowls show any tendency to looseness of the bowels, give more grain and less mash, or use a dry mash.

From ten days to three weeks of such feeding should show quite clearly what most of the hens are going to do. Some will begin to lay as soon as in good condition. Others will grow fat very fast. Some may neither fatten nor lay.

Put those that lay on the general ration, still feeding well, but with more caution.

Sell those that fatten instead of beginning to lay. Sometimes poultry keepers try to *make* such hens lay by thinning them down again, the assumption being that they do not lay because they are too fat. Usually it is the other way: They fatten because the reproductive organs are for some reason or other dormant.

The hens that do not fatten or lay should be marketed if, on close inspection, no reason is discovered for supposing them not fit for food. If one feels in any doubt about that, and has such scruples as he ought to have about selling diseased poultry, he can dress and draw the fowls, and market only those in which he finds the organs normal. Sometimes there is digestive weakness without disease. It might be overcome, and the fowl put in good condition in time, but it is not profitable to keep and feed such fowls, for quite generally they consume as much food as the others, but the food passes through the system, and is voided without much having been assimilated.

To Fatten Fowls in Summer.

The fowls in Lot 3 are to be sold as soon as marketable. Some of them may need no fattening and may, if convenient, be disposed of at once.

To fatten the others, shut them up in a comfortable pen, feed once a day a mash composed of equal parts corn meal and bran, with about 10% of the combined bulk of the meal and bran red dog, or white middlings, or low grade flour, with as much good beef scrap or meat meal added as they will eat freely. Keep cracked corn before them all the time. Give a little green food daily, just enough for a relish. See that they are well supplied with water. Keep them quiet. If any hens are disposed to be quarrelsome, remove them and fatten by themselves in small coops.

Sell the hens as soon as in good plump condition. Don't try to get them excessively fat. Our market does not want that kind of poultry. There may, as in Lot 2, be a few hens that will not fatten; dispose of them the same way.

This method of fattening is one that anyone can use anywhere — in *almost* any season. I say "almost any season," because in an extremely hot season it is sometimes found hard or impossible to fatten fowls this way during the warmest period. I am not prepared to say whether crate fattening would accomplish the desired results with those hens at such times, but am inclined to think it would not.

As a rule it does not pay to give much time at this season to the hens that are not to be kept over. If they cannot be put in good marketable condition quickly sell them just as they are.

Molting.

Of late years a good deal of interest has been manifested in the matter of regulating the molting of fowls.

It has been claimed that a period of fasting or short feeding followed by a period of very heavy feeding of rich foods would cause the fowls to quit laying, drop the old feathers quickly, grow the new coat quickly, and promptly resume laying. This theory was, I believe, first exploited by an institute lecturer, who was also responsible for several other somewhat sensational stories. I could not learn from him that the hens he claimed to have made molt did resume laying promptly. In fact he appeared not able to produce any proof of real results, though he maintained that he had succeeded in controlling the molt. Various experiments made along this line have had varying results, not all fowls being affected alike by the treatment. It seems to be established that in some cases a molt is enforced, but not that there is any practical advantage in doing this. Investigations, however, have not been general enough to warrant any positive general conclusions, and as far as I know none have followed the hens through the year following the enforced molt. As the case stands I could not advise anyone to attempt to control the molt in this way except fowls he was willing to experiment upon.

The Time of the Normal Molt Varies.—Hens begin to drop some feathers in June, may drop many in July, and from that time on till winter in any large stock fowls may be found in different stages of molting. If there are any general rules that could be laid down in regard to molting I have never discovered them. The greater number of hens will be "in full molt,"

that is, quite bare of feathers, and not laying, in September and October, though often hens that keep on laying in the fall do not get right down to growing the new plumage until November.

Rations for Molting Hens.

The food requirements of the molting hen do not differ materially from those of the laying hen. Some authorities prescribe rations rich in protein and low in fats, as containing in better proportion the elements required for feather production.

I began by using such rations, but soon discovered that my hens molted better, growing a much better and glossier coat of feathers if fed a ration rich in fats. Experience in this respect has been the same with hens molting in midsummer, and those molting in late fall, except that the hens molting in summer molted much more quickly and often laid continuously right through the molt. For many years my method of feeding molting hens has been:—

Morning.—Mash as in Mash No. 1, Lesson I., but nearly half corn meal.

Noon.—(or all day feed)—Wheat or barley broadcasted in the yards.

Evening.—Cracked corn scattered in the yards, followed just before the hens go to roost by as much more cracked corn, fed either in troughs or handfuls on the ground.

Cabbage before the fowls all the time.

Generally hens do not all molt alike. Some molt quickly, others slowly. It is a good plan, whenever practicable, to keep them sorted over, and have all hens in one pen or lot very nearly in the same condition.



LESSON XII.

Continuous Poultry Houses.—Continuous vs. Separate
Houses.

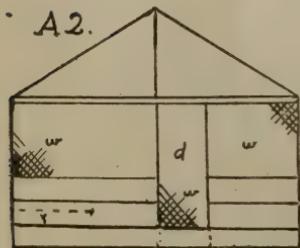
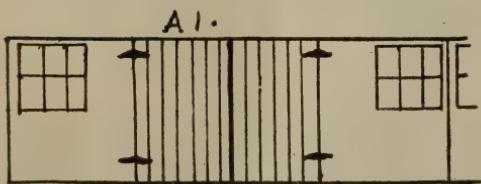
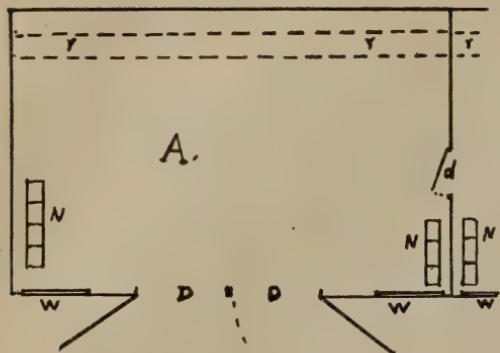
SINCE the subject of this lesson was announced, so many readers about to build have written me asking my opinion as to the relative merits of continuous and separate poultry houses, that I have thought it better to make the discussion of that subject preface the descriptions of continuous houses, and so give those interested in them the opportunity to consider the plans and the advisability of building such plans in the light of what may be said for or against the system of keeping poultry in large, long houses.

It is undoubtedly more convenient for the poultry keeper to have his fowls all under one roof or in connecting buildings in winter. It is easier and in every way more agreeable to be able to pass from the grain and feed room to any and all of the buildings occupied by fowls without going from under cover, and without taking more steps than absolutely necessary.

In winter, again, for long periods, and sometimes through quite the entire winter, it may be impossible for the fowls to get out beyond such little strip of ground next their house as may be kept clear of snow for them, and hence all the advantages of large yards and free range are for the time inoperative.

As far as winter poultry keeping goes, in all latitudes and localities where there is much snow or mud, there is no advantage in detached, separate houses, in either of the matters alluded to above, i. e., economy of labor and benefit of ample outdoor room to the fowls.

There is, I think, but one point in which a continuous house is objectionable in winter. If built as many such houses are built, without due precautions to avoid drafts and to secure uniform conditions throughout the building we are very apt to have conditions of temperature, dryness, etc., varying greatly within the house and in parts of it becoming so unsuitable that the fowls in those pens do not do as well as the others do. This difference in conditions in pens in the same house is not the only cause of uneven results, but it is the cause very often when not at all suspected. To test for it. If there are in a long building with numerous pens certain pens of fowls laying well, and others not laying well, or some perfectly healthy while others either seem unthrifty or one by one contract some disease, (particularly colds) though there is no reason in the stock itself or in the care given that will explain the differences, try exchanging the fowls in two such pens. If, as will often be the case, the pens, soon after changing places, begin to change in condition and productiveness you may be quite sure that the bad condition and unproductiveness are due to some fault in the building. If a building is so constructed that no difficulties of this kind arise in operating it, the continuous house system is, I think, without question the best system for winter poultry keeping.



Section of Continuous House With Connecting Pens.

A ground plan, A 1 front, A 2 partition between pens.

The ideal poultry plant I would consider a plant that gave the best conditions for both winter and summer. That means practically two sets of buildings; continuous houses convenient to the dwelling and to other outbuildings for winter, and separate houses distributed about the farm for summer. This is what I would have if I were keeping a large stock of poultry on a large farm. On my place now I have the two pen building described in Lesson IX., and five smaller one pen houses distributed about the place. Winter before last we had these small houses up near the barn, the two pen house being farthest from the dwelling. In the spring all the small houses were put beyond the two pen house, the farthest away being some 200 ft. from it. Last winter the small houses were used as in summer, because I did not care to move them in and then back again in the spring. The intention is to have the south end of the barn basement fitted for poultry, and keep in it through the winter about as many hens

Equally without question, I think that for other seasons of the year it is the worst system. If a large number of fowls are to be kept on a small piece of ground, we must consider the continuous house system the best for such circumstances; but it is a mistake, and a bad one, for a person who wants to keep a large stock of fowls to use intensive methods.

I do not mean by that that poultry cannot be made profitable under such conditions. It would be absurd to claim that they could not—for they have been kept at a good profit under such conditions by a great many people. But the profitable life of the intensive poultry plant seems to be short. The ground becomes contaminated, and the stock does not thrive as it did when the plant was new. The system is a laborious one for the poultryman—keeping his nose on the grindstone all the time, and unless he is uncommonly pleased with that process, when results begin to be less

satisfactory he becomes discouraged, and grows somewhat careless and slack about his work, and his plant soon becomes an unsatisfactory proposition. This has been the history of many a venture in which the poultryman, after a few years struggle, succeeds in getting his intensive poultry plant on a paying basis, only to discover after a few years more how difficult or impossible it will be to keep the plant up to the mark made in those fat years.

For all times of the year but winter, and perhaps we should include early spring, the easiest way to handle fowls is to give them either free range, or yards so large that they have all the advantages of free range. To keep fowls in this way houses of one or two pens are used. Whatever may be said of the relative merits of warm or closed and cold or open houses in winter, there will be no disagreement on the proposition that almost any old leaky shed will do for summer.

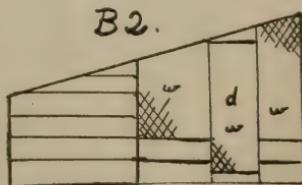
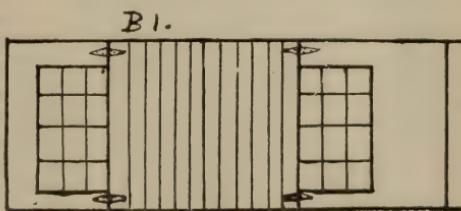
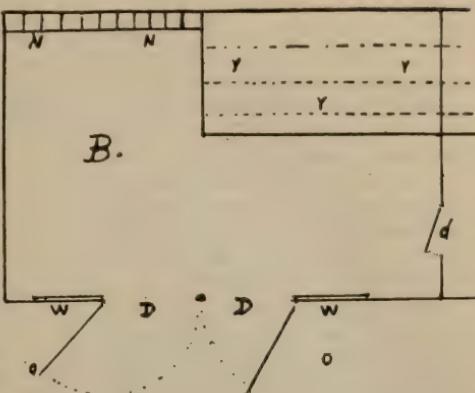
as the small outlying houses will accommodate in the summer. This, as the reader will notice, is a modification of what I call the ideal system, which is a complete double system.

For my own use, and for all round economy, I would use the double capacity, one set of buildings for winter, and the other for summer, rather than adopt the plan of grouping small movable houses together for winter, and spreading them over the farm in summer, because I believe it would be cheaper in the long run, and altogether more satisfactory.

It is a good deal of a job to move a building having a capacity of over a dozen to fifteen fowls, anyway you do it. To move a lot of such buildings twice a year, it will take but a few years to make the cost of moving exceed the cost of a summer plant. Further, the moving of buildings twice a year may interfere seriously with other work; or if other work interferes with it the delays are expensive, and may put operations out of joint for the whole season. Then the grouping of small buildings close together makes a very poor substitute for the continuous house system in bad winter weather. I would not say it was impossible to group the separate buildings temporarily, and arrange everything conveniently, but I have not seen it done. Where I have seen one pen houses placed close together, it would have been as well in my judgment to have placed them far enough apart to make a system of houses like my two pen house. Such houses placed with ends 30 to 50 ft. apart, and the rows of houses 150 ft. or more apart give a medium between winter and summer conditions of convenience that will be found very satisfactory on small farms, or on farms where it is desired to keep the fowls permanently on the same ground.

In conclusion I want to say to the reader debating the house question—Don't give undue weight to my opinion. I have tried to emphasize the need of adapting systems or plans to conditions. I would also emphasize the need of adapting them to personal preferences. Because I don't object to traveling even through the snow the few hundred yards which must be traversed in caring for my fowls as I have them in winter, it does not follow that you will be suited with such conditions. One reason I don't object to it is that that may be the greater part of my *outdoor* exercise at that season. If I were out doors all day it might be different. I might still continue to do it as on the whole the best arrangement, but very likely would consider that feature sometimes a drawback.

Plan your buildings to suit your conditions, your methods of poultry keeping and yourself. If you have preferences indulge them unless you find them condemned by persons of good and fair judgment. Don't take anyone's ideas on authority unless the reasons they give seem good. Some useless features have been introduced into all buildings in a community merely because some one who was successful had them in his building, though these features were superficial and did not at all affect results.



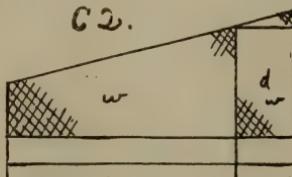
Section of Continuous House With Connecting Pens and Enclosed Roosts.
B ground plan, B1 front, B2 partition between pens.

Continuous Poultry Houses.

The continuous poultry house, as the descriptive name indicates, is a system of similar compartments, or pairs of compartments united in one long building. The single pen or pair of pens is made the unit of the system. When a single pen is the unit, each pen throughout the entire system, which may extend to a number of long buildings, is in construction a duplicate of every other pen. When the unit is a double one it is because the plan adopted makes some arrangements, as of doors, windows, roosts, and nests alike in the alternate, but opposite in the adjoining pens.

Of the plans of separate and two pen houses, given in Lessons IX. and X., the first house in Lesson IX. is not adapted to become the unit of a system in a continuous house. A pen of the second house might be used as the unit in a short system, but the longer the house the more inconvenient it is to have to go through the end pens to reach the middle ones, and I would say that it would not be advisable to use this arrangement for a house of more than four pens. With the dimensions used in my building this would make the house 56 ft. long.

Mr. Davis' plan in Lesson X., as given, is not adapted to a continuous building. It might be made so by simply changing the position of the roosts. The plans given by Mr. Pattison, Mr. Ryan, and Mr. O'Brien all show pens to which may be added similar pens, with the

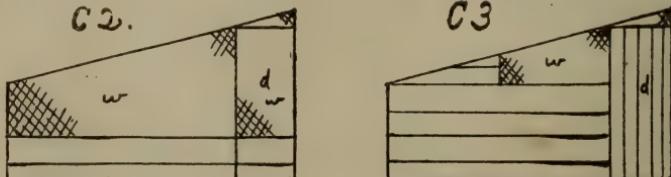
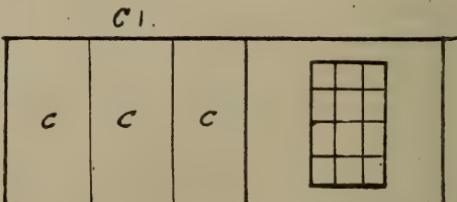
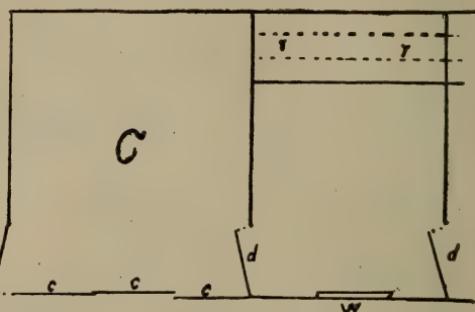


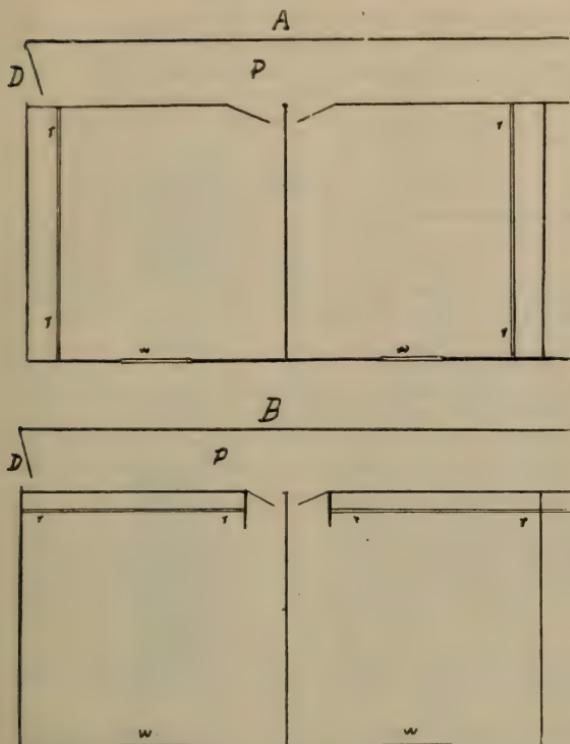
Section of Scratching Shed House Without Walk.

same limitations C ground plan, C1 front, C2 partition between sheds, C3 partition between pens. as I gave in commenting above on adapting my house to a continuous system. Mr. Grosvenor's plan needs alterations all around to make it a good unit for a continuous house system, though, as will be seen by comparison with some continuous house plans, the effect of his arrangement is not so unlike theirs. It is only that dimensions and location of openings and fixtures are made without reference to possible adjoining pens.

By reference to the classification of houses in Lesson VIII., the reader may note that with very few exceptions the features there enumerated may be applied in the building of continuous houses. The three general styles of construction are all used in continuous houses, while of the seven styles of roofs mentioned, only two — the monitor top and the double pitch east and west roof — cannot be used with continuous houses facing south, or nearly south, as most such houses do.

Roughly estimating the materials for a continuous house consists merely in taking the estimates for one pen or section and multiplying as many times as the unit is to be repeated in the long building, except in this one point, that the ends of the building are the same for one





Diagrams of Two Pens in Continuous House, With Walk in Rear.

In A the roosts run parallel to the walk; in B, parallel to division partitions.

my two pen house as the unit in a long house. Next a pen of the same size and general construction, but with single pitch roof sloping north, and with the interior arrangement changed to bring the roosts in adjoining pens, and the fowls on the roosts closer together, and make easier the enclosing of the roosts, if that is desired. This second plan would appear to be the better adaptation of my plans for fowls that seemed to require warmer quarters than I give. With this plan it is possible, by doubling the wall back of the roost, to keep the fowls as close at night as in a house built so all around, while the expense of building is much less. I would commend this plan for a trial to any who hesitate to go to the extreme in simplicity of construction.

The nests in this plan are placed along the rear wall, not as conveniently for the collection of eggs as the nests in the first plan, but better to prevent egg eating, if there is danger of that.

The third plan shows a section of the once popular scratching shed style. Let me say in regard to this plan that, while I do not consider it the best or most economical when it is desired to keep as many fowls as possible in a given space, if the purpose is to keep fowls, especially those least able to stand severe weather in the best of condition, this style of house can be arranged to furnish conditions as nearly ideal as we can make them.

It has been found in using scratching shed houses, as at first exploited, that the fowls generally preferred the open shed. This may have been partly because they were fed there, and there was nothing to do in the other room but sit on nest or roost. Now most of those who built scratching shed houses wanted to stock them to the fullest possible capacity, and, finding that the hens preferred the shed during the day time, and that the muslin fronts were not altogether satisfactory, many of them put glass windows, or large wooden doors, or a combination

pen or for twenty, and instead of the solid wall between pens we have generally a partition partly of boards and partly of wire netting. For absolute accuracy in estimates, one should make drawings of his completed house, and figure from the drawings; and to avoid errors in construction this should be done anyway. It is not always necessary that the amateur builder (most poultrymen belong to this class) should follow the plan he uses in every detail of construction, but it certainly is advisable, and personally I would consider it necessary that before beginning building he should know just how he proposes to put his building together, and the only way I know of demonstrating to himself that he does know is to prepare a plan to be followed as he works. His plan may be very crude from an architect's standpoint, but if it indicates what he is to do in such a way that he can go ahead without making mistakes that is all that is necessary.

The figures accompanying

show first a single section of

of these in the front of the shed, and took out the partition between roosting room and scratching shed, thus making a scratching room house. But some few breeders of fine fowls, with the object of keeping their fowls in the best possible condition, have gone back to what seems to have been the original scratching shed idea, and used the closed part as any other closed poultry house, making the open shed an additional protected outdoor privilege. Those who have tried this way of handling breeding stock think it pays.

Walks in Continuous Houses.

The plans we have been discussing do not provide for a walk in the house. When a walk is to be used the floor arrangement should be as in the accompanying diagrams. The first two are for the ordinary closed house, and are identical except in position of the roosts. The third shows how a scratching shed house is built with walk in the rear. On page 105 is reproduced a diagram of such a scratching shed house built some ten years ago. As far as I recall now this is the only house built on this plan I have seen.

Houses are sometimes built with the walk in front of the pens. I have seen but one such, and have seen descriptions of only one or two others. The plan does not commend itself to many poultry keepers. The sun and light have not such ready access to the pens, and the walk has to be elevated to allow the fowls to pass under it to the yards in front of the building. We may consider this arrangement as warranted only by peculiar and insurmountable conditions.

Doing the Work From the Walk.

A number of continuous houses, both short and long, have been planned to do all work from the walk, with the roosts placed as in the second diagram, the nests under the droppings boards, and the feed troughs either below the nests or in the passage and accessible to fowls standing under the nests. Not many who have arranged this way will build after that pattern a second time. In

only a very small proportion of the houses so equipped have I found the work all being done from the walk as designed. It is not nearly as convenient in practice as it looks on paper, and when the pens are never entered in doing routine work there is likely to be a great commotion among the hens when it is necessary to go into the pen.

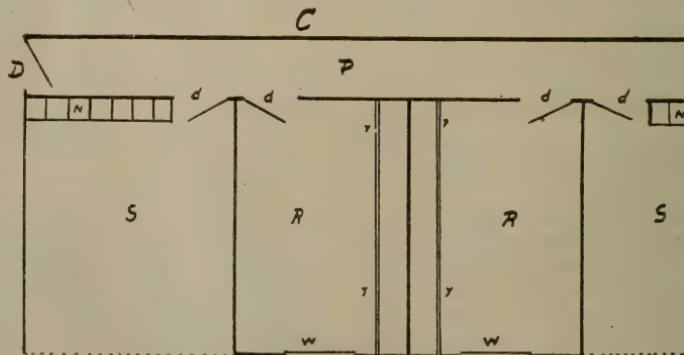
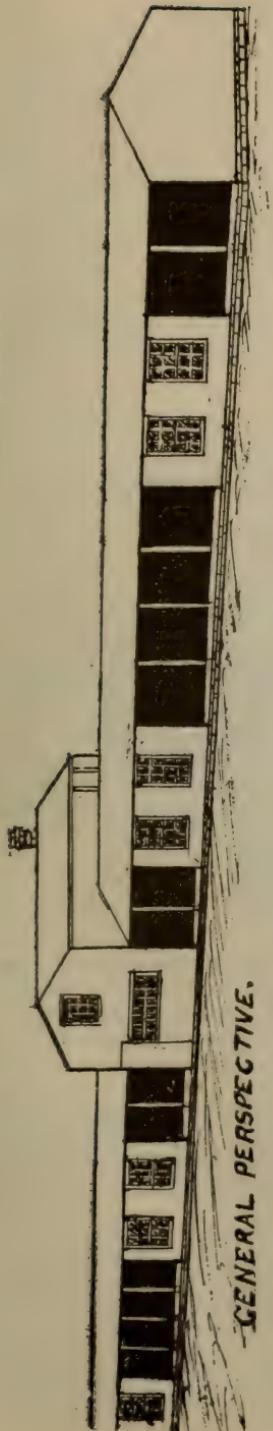


Diagram Showing Method of Building Scratching Shed House With Walk.

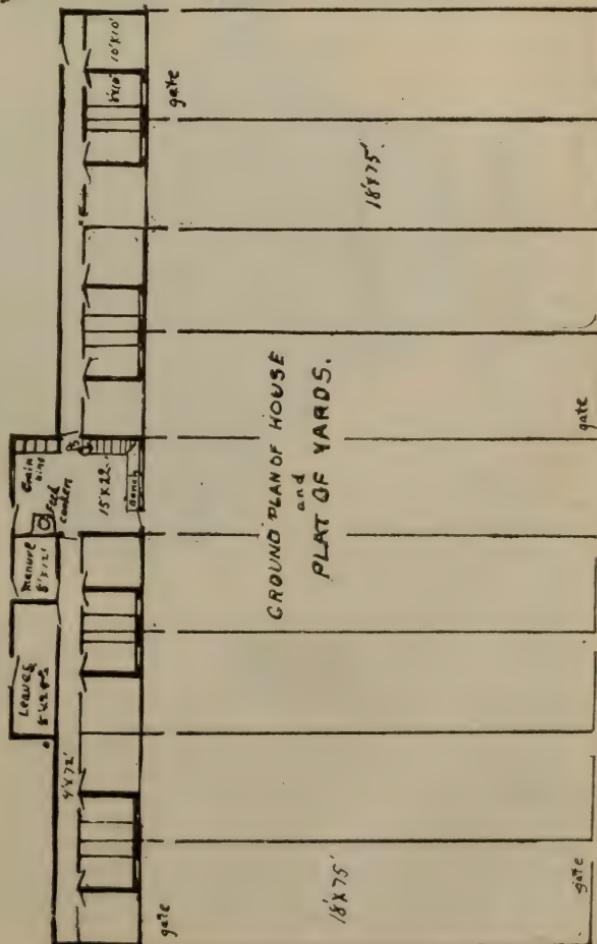
The Passing of the Continuous House.

The continuous house plan in its extreme developments was a fad. Men seemed to vie with each other in building long houses. From buildings 100 to 150 or at most about 200 ft. in length they went to in one case, as my memory serves, about 600 ft. The shorter buildings answered their purpose very well. The very long ones, as a rule, were on plants that failed, and these unwieldy buildings clearly had something to do with the failure.

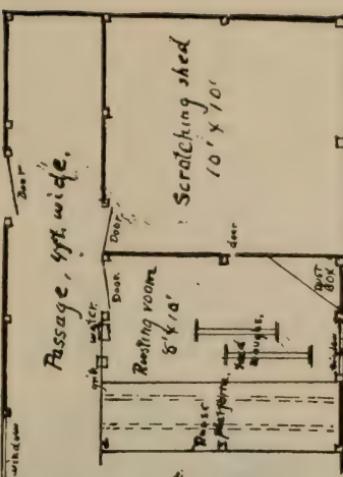
Just at present there is reaction against intensive methods, and with it inevitably goes a lack of interest in continuous house plans which may easily be carried too far. In the preliminary remarks on this lesson I tried to show how and where the continuous house plan can be used to best advantage, and is superior to separate houses. In considering house plans, as in nearly all matters relating to poultry keeping, we will find it best not to commit ourselves unqualifiedly to any one idea.



GENERAL PERSPECTIVE.



GROUND PLAN OF HOUSE
and
PLAT OF YARDS.



**GROUND PLAN OF PEN AND SHED
IN EAST END.**

*Open Front Scratching Shed House With Walk
in Rear.*

LESSON XIII.

Incubator Rooms and Brooder Houses.

IN DISCUSSING the topics under the title of this lesson, I shall not go into details of construction as fully as in the treatment of houses for adult stock, for these reasons :

In the first place to do so would involve a good deal of repetition of what has appeared in the other lessons, for many small buildings used in connection with artificial methods are quite like some of those already described. In the next place the larger buildings for pipe systems of brooders must often be planned with reference to the arrangement of the heating system, and the incubator and brooder manufacturers that sell heating systems furnish plans especially suited to them, and I would by all means advise any who intend to build brooder houses for pipe systems of brooding to decide first on their heating arrangements, and build after designs furnished by the manufacturers.

Incubator Rooms.

For an incubator room most incubator operators prefer a cellar. It is desirable that the temperature of the room in which the machines are to be operated should not vary sharply with outside fluctuations of temperature. This condition might be obtained in a room wholly above ground by making the walls very thick, but such a building would be expensive. The conditions sought are as nearly as possible attained—and that at comparatively small expense by building cellars, as shown in the illustration.

Sometimes the cellar used is under a building, but in general cellars built expressly for this purpose are placed at a little distance from other buildings. The use of the cellar of a house or barn for incubators is quite common when the number of machines operated is too small, or the permanence of the use of machines too uncertain to seem to warrant the expense of construction of a special cellar.

In making use of house and other cellars under buildings of more value than poultry buildings generally are, one has to consider first of all how it affects his insurance. At present most insurance companies either refuse to take risks under such circumstances, or charge a very high rate. A movement is now on foot among incubator manufacturers to induce insurance companies to modify their regulations about incubators and brooders. Almost simultaneously with the beginning of this movement some people in the insurance business seem to have discovered that harsh regulations about the operation of incubators and brooders were very poor policy. So it is likely that before long there will be a change in conditions, and an

agreement as to the circumstances under which incubators may be operated in dwellings and such other places as people are likely to want to use for them.

More fundamental objections to putting incubators in places not originally made for them are that too often the surroundings are not what could be desired. When an incubator is operated in a cellar or room used for other purposes it is too much exposed to outside influences, and when a part of such room is partitioned off for the incubators, the most favorable conditions for the operation of the machines are seldom obtained. The chief fault in such improvised quarters for incubators is the lack of suitable ventilation. A common cellar is often but an ill ventilated place at best, and the air in it good only when brought in in stronger currents than are wanted in an incubator room. When a portion of such cellar is set apart for incubators the atmospheric conditions in that part are generally not made better than in the main cellar.

How far poor ventilation of the place in which the incubators are operated is responsible for



A New England Incubator Cellar.

weak chicks and for losses of chicks which were thought all right when they hatched, it is impossible to say. Some of those making careful investigations into diseases of and mortality among artificially hatched chickens are beginning to be very strongly of the opinion that a lack of fresh air in the machines is one of the most common causes of trouble, and that this lack of air is due not so much to faults in machines, but to the imperfect adjustment of the surroundings — that is, of conditions in the incubator room to the requirements of the machines, and the impression gains ground that in future more attention will have to be given to the balancing of external and internal conditions of the artificial hatcher.

It appears from some observations and experiments made recently that the time may soon come when directions for operating incubators will be much more comprehensive than at present, the necessary variations for different conditions being tabulated so that the operator may the better adapt the running of his machine to existing conditions. This may not be done with absolute accuracy, but far better than by guess. Perhaps I can make the meaning more clear

by an illustration from amateur photography with which many readers are somewhat familiar. The photographer can purchase a little book containing carefully worked out tables which enable him to determine in a moment just what time to give an exposure with the diaphragm of any given dimensions and with any possible combination of light and surrounding objects. By the use of such tables the photographer reinforces and regulates his judgment, and is enabled to eliminate from his work much of the risk of spoiling plates or films and losing much desired pictures. So in the development of artificial incubation we are evidently coming to a time when the operator will be given more appliances to record conditions he has to reckon with, just as the thermometer now records the temperature; and will be furnished tabulated instructions as to the adjustment of the machine to conditions.

Meantime the amateur incubator operator need not be discouraged because in the operation of incubators he must rely much on his own judgment. At this stage of affairs he may get as good results as others by simply being sure he is on the safe side.

I went one day to see the new incubator cellar on a large duck plant in this state. It was



One of Farrer Bros.' Brooder Houses, W. Norwell, Mass.

built something like that in the illustration, but with the walls high enough above ground to let in full half windows on the sides, while the roof was high in the middle. As you entered the door and looked about the effect was much like that of an empty church. In a church or any other building for large gatherings the walls must be high that there may be in the room a volume of air great enough to move and create the necessary ventilation without great change of temperature. The builders of this incubator cellar had the same end in view. There was room enough in the building for a cellar higher than usually used for incubators and for a very large loft over it. There was so much room that my first question was as to whether they had completed the building, or intended to make a loft. The reply was that the building was to be used as it was; that it had been planned to give abundance of air to the machines. I noticed no odor from the lamps and machines in that cellar. I have gone into many incubator cellars in which the odor was very bad. In some of these this was because ventilation was defective regardless of the number of machines in operation; in others it was because entirely too many incubators were in operation in the room.

Therefore, wherever you run an incubator see that ventilation is good enough to remove bad air, and wherever you run more incubators see that this good condition is maintained. That it is possible to hatch chicks in crowded cellars where the air is bad, there is no doubt. There is lots of it done. That it is such chicks that give most trouble many think they begin to notice. Build the incubator cellar as large as you are ever likely to use it. Though it may always be too large—better that than too small. Space in it not needed for incubators may be used for an egg room or for storage of light, clean articles, as coops, egg boxes, and baskets, etc.

As to the structure of the incubator room: If a cellar, the walls below the surface should be of stone or brick, the floor of cement, the entire room above the ground lined with matched lumber, and the windows double, for this is a building in which it is necessary to keep the temperature moderate, avoiding both extremes.

Brooder Houses.

In artificial brooding there are two systems. In one small brooders each heated by its own lamp are used. In the other a hot water or steam heater sends the heat through a system of pipes that extends throughout a building constructed on the continuous house plan.

A pipe system is sometimes used for two or three hovers, but in that case the heater is small, and the entire system quite as easily portable as an individual brooder. Usually the building for a pipe system approaches a hundred feet in length, and may very much exceed it.



View of Part of Exterior of Brooder House

At Lone Oak Poultry Farm, Reading, Mass.

ing used to shelter the growing chicks. Later it may be used for surplus cockerels or even for a pen of laying or breeding fowls.

Individual brooders may also be used in such continuous houses as are used for laying stock, one brooder in each compartment; but the brooder house especially fitted for individual brooders is as a rule used for brooding only, and the same is true of the pipe brooder houses.

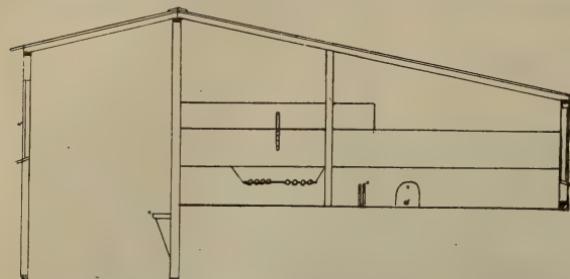
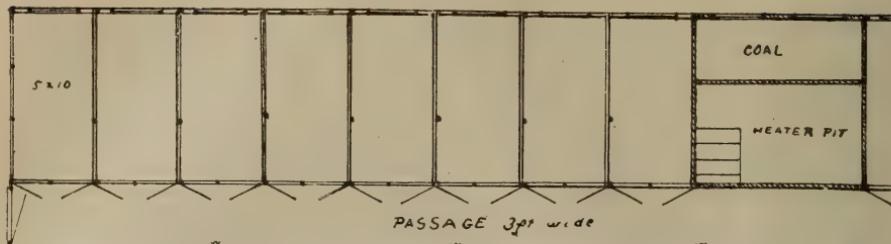
Where large numbers of chicks are to be hatched in cold or cool weather I think the long brooder house with pipe heaters over the hovers is by all odds the best plan.

We say, then, that for growing winter chickens, for growing broilers and for all chicks which must be kept indoors or closely yarded the pipe system is preferable when operations go beyond the number of chicks which can be handled in a few brooders.

A few years ago a favorite style of brooder house arrangement was to build one end of the house for nursery brooders—these being individual brooders—for the youngest chicks and use the pipe system in the other end. A bank of pipes extended along the north wall of the nursery supplementing the heat of the individual brooders. This arrangement was devised because of the general difficulty in keeping youngest chicks under pipes warm through cold nights. Of late years it has been discovered that merely using a heater of sufficient capacity makes it possible to maintain the heat under the pipes.

For individual brooders small buildings may be used, or the brooders may be put in such long buildings as are used, for pipe brooding systems—a brooder with its lamp being required for each section in the building.

For those who batch only a few small hatches each year the individual brooder in its own small building is generally more satisfactory. When the chickens no longer need the extra heat the brooder may be removed and the build-



Ground Plan and Cross Section—Brooder House at Lone Oak Poultry Farm. The partitions between the pens there are two upright pieces of 2×3 scantling for each partition; one at the passage, going from the floor of the passage to the apex of the roof, and one a little forward of the middle of the house, which goes from the floor of the pens to the roof. Partitions between pens are of solid boards 2 ft. high. The 8 in. board extending from the passage half way forward is not a part of partition, but a board used to put across pens to keep small chicks close to the hover.

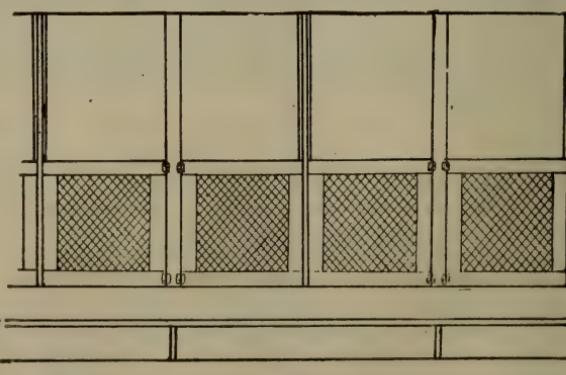
The real trouble here, as so many places in poultry keeping, was false economy, the desire to keep close to the limit. Poultrymen put more chicks than they should in a brooder, then tried to keep the brooder warm through extreme cold weather with a heater only equal to heating it in ordinary cold weather. They have learned now that it is easier and cheaper to use a heater that will do the ordinary work required of it without working near up to its capacity than to try to get the results by overworking a smaller heater.

In designs for continuous brooder houses, there has been variety without end. Almost every model of a continuous laying house, except the scratching shed and full monitor top plans, I have seen in brooder houses—and these may have been used. The prevailing style, however, is the plain long house with double pitched roof, and the types of this style of house do not vary strikingly in appearance or construction. Some are full height (about 6 ft.) at the sides. Others are built lower, the front wall being not more than three and a half to four feet high, and the rear wall a foot or so high. In such a house the walk is excavated to a sufficient depth to give plenty of head room over it, while the rest of the

This house is only 3 ft. high at the plate on south (front) side, and 5 ft. from the level of the pen floors to the apex of the roof. The floor of the passage in the rear of the pens is excavated to a depth of 2 ft.

The width of the house is 14 ft., the length of each pen being 10 ft., and the inside width of the walk 3 ft. 9 in. Each pen is 5 ft. wide, and is lighted by a half window (6 lights, 9 x 12) in the middle of the front of the pen.

To support the roof and carry



Partition Between Pens and Passage in Lone Oak Farm Brooder House.

This partition consists of two light frames for each pen covered with 1 inch mesh poultry wire, and hung on hinges.

house has a floor only a little higher than ground outside. The object in building the house low is not so much to save cost as to conserve heat, the low building being more easily kept warm than the higher one. Whether there is, on the whole, any real economy in saving heat in this way seems doubtful. From what I have seen of the low and the full height houses in operation, I consider the latter the better plan. There are several reasons for this:

- 1.—The house heats up too much on warm winter days, and becomes uncomfortable early in the season.
- 2.—It is an inconvenient house to work in as soon as you have to get out of the walk.
- 3.—It cannot be well adapted to other uses.

These reasons will seem strong, or not according as those who consider them look at the points involved. It seems to me that the low roofed house fails to meet several conditions which may have to be considered in operation, while with heaters of ample capacity the advantage of reducing the proportion of cubic to floor space is not of such importance as when the smallest possible heater is used.

Further, in view of the fact that it may become desirable to change the lines on which a business is done, it is good policy to use buildings adaptable to any line whenever it is practicable to do so.



LESSON XIV.

Simple vs. So-Called Scientific Poultry Feeding.

SIMPLE poultry feeding I would define as following, or trying to follow, the practice of successful poultrymen.

It is what might well be called the "natural method" of feeding; and I might add that it seems quite the natural thing for the poultry novice to begin to learn to feed in this way. The first thing he wants to know about feeding is how successful poultrymen feed. Whenever he hears of unusually good, or even of average good results he wants to know how those fowls were fed and housed — that he may treat his the same way.

In a general way we may say that the instinct which prompts him to do this is a safe guide. In every matter in life we learn by doing as others do, and learn most by trying to follow those who have done best.

As in other matters, one who tries to adopt the ways of another, or to follow general methods, does not always succeed. There may be various reasons for this; different conditions of which he makes no account may require a different method; he may not properly understand and apply the method; or he may fail to adapt other features of his management to those he tries to introduce, etc. There is no way of guaranteeing success by imitation of the successful, but, on the whole, and in the long run, that is the way to achieve success, and, as I have said, the instinct which prompts the beginner to find out and try to follow the methods of those who have succeeded is a safe guide. Following it, he may advance more slowly than is agreeable, and his progress may be marred by mistakes, but if he persists he wins out in the end.

In his efforts to learn how to feed poultry in the simple natural way the novice is perplexed by the lack of explicit, exact instruction on what seem to him the points where it is most necessary that instructions should be very specific, and leave no chance for mistakes. Most important of these is the question of quantity. He wants to know how much to feed in the aggregate, and the exact proportions of the different foods used in a complete or balanced ration.

He finds no practical feeder willing to give him this information. If one can tell him just how much he feeds to a given number of hens under certain conditions, he qualifies the information by adding that this amount might not be just what the novice's flock of the same number might require, and that it also might be necessary to somewhat vary the proportions of the different articles in the ration. He must use judgment, feed according to results, condition of the fowls, etc.

To many novices this lack of definiteness is exasperating. They cannot understand the necessity for it, and they conclude that the trouble is not that it is impossible to give specific instructions, but that those who give them qualified instructions for feeding have not observed closely enough to be able to be exact.

To the novice in this frame of mind comes the expert writer on scientific feeding, purporting to give him in his science of feeding precise and exact instructions as to the feeding of fowls for any and all purposes.

This science of feeding is very interesting, and as long as certain essential things are disregarded, seems very plausible. Let me state it briefly:

The Modern "Science" of Feeding.

The discussion of scientific feeding begins with the proposition that certain food elements of different character are required to sustain life, promote growth, and keep up the various functional activities of the body; and that the proportion of each of these elements required can be ascertained and expressed in mathematical figures, which, in turn, may be taken by the poultryman and applied in his practice. It is assumed that in this way he may arrive at sure results and absolute economy in feeding.

The Needs of an Animal Organism.

The food which a fowl takes into its system serves these three purposes:—

- 1.— To build up and sustain the organism.
- 2.— To keep up the warmth of the body.
- 3.— To furnish energy — strength — which is expended in every movement.

Perhaps as the same classes of food elements serve the second and third purposes we can still further simplify the statement by saying that the two principal functions of food are:—

- 1.— Nourishment.
- 2.— Heat and energy.

To provide for these two wants we have three kinds of food elements, technically known as *proteids*, *carbohydrates*, and *fats*.

These elements are found in varying proportions in the articles we use for poultry foods. Without attempting a scientific description of them I will give the following plain definitions suitable for the present purpose.

Proteids (or *protein*).— Albuminous or nitrogenous matter occurring in different forms in different kinds of food, but having everywhere the same essential qualities. In grains it is in the form of gluten. In milk it is casein; in meat and blood, fibrin; in bones, gelatin.

Carbohydrates.—Carbonaceous matter, principally starches.

Fats.— May be regarded as highly concentrated, condensed carbohydrates.

These are the principal food elements. Besides them all foods contain some (and some a great deal of) water, and most foods contain mineral and fibrous matter which are mostly indigestible.

The Theory of Scientific Feeding.

The theory of scientific feeding is based on the assumed necessary relation of the needs of the fowl to the food elements which are given it to supply those needs.

Thus the scientific authority on poultry foods says that having ascertained just what food elements, and in what proportions, were required to produce certain results with a certain number of fowls, we are able from this data to formulate a rule which will apply universally. Whether or not this is the fact we will inquire a little further on.

The expert in scientific poultry feeding, following the lead of scientists in cattle (and in human) feeding studies, makes use of two measurements of food values which he calls *nutritive ratio* and *potential energy*.

By *nutritive ratio* he means the ratio of the proteids or nitrogenous matter to the combined values of the carbohydrates or starchy matter, and the fats, (the value of which are for the purpose reduced to terms of "carbohydrates").

By the *potential energy* of a food he means its heating capacity, its fuel value, which he expresses in *calories* per ounce.

His science of feeding proceeds upon the principle that, having established standards of nutritive ratio and potential energy as the proper standards, whatever combination of foods he can make that will figure out this ratio and this heating capacity, will be a complete or balanced ration, while a ration that will not figure out to such standards is an incomplete, ill balanced ration.

Some Scientific Fallacies.

It is not necessary to explain the theory in every detail. Of more importance here are certain fallacies promulgated in connection with the teachings of scientific feeding. Chief of these is the oft repeated statement that a fowl fed on a single grain — corn being most often used in illustration—would in time starve to death, because corn did not supply the elements it needed in proper proportion. Like most fallacies, this is a perversion of the facts upon which it is supposed to rest. Neither corn nor any other single article of food makes as good a diet for fowls as a ration in which a variety of grains is used. Nor is a grain ration, though composed of many different grains, as good as a ration in which vegetables and meat are used to supplement the grain foods, but the bad effects of poor rations are not so conspicuous as some say, nor is the difference in results always as marked as some would have us believe.

To show the absurdity of the common opinion that corn, as compared with such grains as wheat, oats, etc., is very deficient in "flesh forming" elements, and contains a dangerous surplus of fats and starchy elements, let us make a few comparisons, taking figures from the tables in "Poultry-Craft," which were made from U. S. government bulletins, giving average analyses of food stuffs:

Grain.	Protein.	Carbohydrates.	Fats.	Nutritive ratio.	Potential energy.
Corn,	10.4%	70.3%	5%	1:7.9	106
Wheat,	11.9%	71.9%	2.1%	1:6.3	102
Oats,	11.8%	59.7%	5%	1:6.1	96
Barley,	12.4%	69.8%	1.8%	1:6	100

Now it is plain that ordinary or average corn has in it a smaller percentage of protein than any other of the grains in the list, and that its nutritive ratio is very much wider, and its potential energy higher. And if we accept as right the standards of nutritive ratio and potential energy given by the writers on scientific feeding, we must admit that corn is a very bad and dangerous food.

But in regard to these standards the position I take is this: So far as I can discover, not one of these would-be authorities has in a scientific way established standards for poultry feeding, and the standards which they use, adapted from other lines of feeding, require combinations which no practical feeder would think of using.

It might be said that this was because of the ignorance of the practical men, but as far as I am able to learn, no "authority" on scientific feeding has ever done any feeding that by its results attracted attention or made a reputation as a good and skillful feeder.

Leaving out of the question then what the "scientists" say about corn as compared with these other grains, let us inquire what practical feeders find they can do with it in actual practice.

The four grains mentioned above have certain physical characteristics which have to be considered in feeding them. The prominent characteristic of corn is the size of its grains, an ordinary grain of corn being about five times as large as an ordinary grain of wheat. Hence, a fowleating corn will pick up what it wants (provided the supply is sufficient) with about one-fifth the effort, and in about one-fifth the time, that it would require to get a meal of wheat. This means that fowls fed whole corn do not take as much exercise as they feed as those fed smaller grains. In this point we find a reason why whole corn is not the most desirable food that is independent of its composition. The same objection would apply to any other grain if of like size.

To overcome this objection to the form in which corn grows the corn is cracked to different degrees of fineness for fowls, and used in this form. I think it would be impossible for anyone to show in practice any appreciable difference in results of the use of cracked corn and wheat in moderate weather, while in extreme hot weather it would give less satisfactory, and in extreme cold weather more satisfactory results than wheat, all other constituents of the ration remaining the same.

Nature's Checks and Balances.

From the fact that under what might be called average conditions it makes no appreciable difference in results whether corn (cracked) or wheat is fed it is reasonable to conclude that

the differences between them which analysis shows have not the significance attached to them by those who consider wheat a *good* and corn a *bad* food for poultry.

We have then in a very large class of instances the same results from rations which chemically show a difference which if each food element could be used only for its special purpose should also appear in the results.

Why does it not appear in the results?

Because the adaptation of each kind of food elements to its special purposes is not rigid. In the digestion and assimilation of food a shortage of one kind of elements is made up, within limits, from an excess of another kind, or falling back from reserves in the system of the animal or fowl. Just what the limits are within which the fowl can adapt the food it takes to its wants we do not know.

We may reasonably conclude that they are not fixed limits, but vary under different conditions and in different fowls. What we do know is that using the common food articles used by poultrymen in about the proportions in which they are mostly used, we are in absolutely no danger of any of the evils which "scientific" writers on poultry feeding assert are sure to result from improperly balanced rations. If feeding in this way we have trouble it is pretty sure to be due to other causes than the composition of the ration.

The Scientific Rules Don't Work.

I have used corn and wheat in the above illustration because wheat is generally considered the best single grain for poultry, and corn, though more extensively used for poultry food than all other grains combined, is by many writers called a very unsafe and bad poultry food; and also because in corn we have the grain which is farthest from the assumed standards of scientific feeding. If comparisons of results of feeding wheat and corn in rations in which each is made the exclusive unground grain food indicate anything at all, they show that it is nearly always possible for the fowl given a sufficient supply of either to adapt it to its needs, and therefore that it is not necessary for the poultryman to try to balance the ration exactly before feeding it.

On the other side it is possible to show that oats, which theoretically are classed as nearest the correct standard for feeding of any grains, are not eaten well by the fowls if they can get other grains, and unless the oats are of much better quality than it is usually possible to get in our markets, fowls will eat only enough of them to sustain life. So if we take wheat as our standard grain food and compare other grains with it both as to composition chemically and as to practical results in feeding, we find that the food which is theoretically poorer is practically better, and vice versa.

From which it follows that the application of the assumed feeding standards is not a reliable working rule. Whether other standards could be selected which would give us a rule that would work accurately we need not here inquire. To date they have not been.

Fixed Standards Not Applicable to Varying Conditions.

There is another most important point to consider: — Fixed standards can only exactly fit certain conditions. If it is necessary that the feeder should exactly adapt the ration to the needs of the fowl, it is necessary that he should vary the ration to suit varying conditions, and of course he must know just how and how much to vary it for any given conditions.

In the simple, natural method of feeding, the feeder's aim is to give the fowls enough food and in such simple variety that there will be no serious shortage of any one element. Beyond this he does not try to go, but leaves it to the appetite of the fowl to select what portions of each food shall be taken into the system, and to the natural operations of the digestive system to further compensate for errors of appetite.

The scientific feeder may say that by his system and by the use of his rules or his rations the desired economies of food are made certain, and nothing left to the chances of the fowls' appetites or functions, but this is all theory that has never been demonstrated.

Still another obstacle to the practical application of the methods of scientific feeding is found in the lack of uniformity in quality of poultry foods. The analyses given are average analyses. As a matter of fact a lot of corn may contain more protein than the particular lot

of wheat with which it is compared. Without an analysis of every lot of every article he feeds the feeder does not know how closely he approximates the standards he tries to apply in scientific feeding, and is in reality as much in the dark and leaving as much to nature as one who simply follows common practice.

The plain truth about scientific feeding as it has been expounded for poultrymen is that what there is of it cannot be applied by common poultrymen under common conditions, and that it leaves out of consideration the variations in the needs of fowls from day to day which must be reckoned with if there is to be anything like an exact adaptation of rations to actual needs.

And the essential difference between simple or natural, and scientific feeding of poultry is that the first trusts much to inherent tastes and tendencies presumed to be implanted in the organism by the creator, while the other depends wholly on arbitrarily assumed and artificial rules.

The Summary of the Whole Matter.

In a nutshell the question of scientific feeding is simply this:

The exposition of it has an academic interest, but to attempt to put its formulas into practice is to attempt to work a problem in which some of the necessary factors are not given, and cannot be obtained. Our science of poultry feeding is but a "fragment of science."



How to Learn to Feed in the Natural Way.

To acquire skill in feeding fowls one must practice feeding, closely observe results, and use his judgment. Suppose I tell a boy that to project a ball through the air for a given distance a certain amount of energy must be applied, and applied in such a way that the ball, moving with the velocity given it, must describe a certain arc as it moves through the air. A scientist who perhaps could not throw a ball within two rods of the spot he desired it to reach might have figured out all about energy, velocity, etc., applying to the movement of the ball; but what good would it do to tell all this to the boy? And what boy in his senses would think of going out to play ball, and, as he prepared for the first throw, stopping to say to himself, "I must put into this throw just so much strength, and the ball must leave my hand at just such an elevation?" No, the boy takes the ball and throws it at the point he wishes it to reach. The accuracy of his aim depends mostly on his previous experience and skill in that line. If he misses, he tries again, and without being very conscious of its efforts, his mind, too, works all the time, comparing each throw with others, and estimating differences and gradually bringing the muscles under control so that before long the boy is sending the ball to the mark every time, and he may acquire marvelous control of the ball, not only in accurate throwing and in speed, but in throwing it so that its path shall be eccentric, or its speed changed in seeming defiance of nature's laws as it flies through the air. And all this he does without either knowing or caring anything about the scientific expressions of the various features of his performance. There is practically no limit to the number of illustrations that might be made on this point. Every line of work and every sport abounds in them.

When men work with machines, or with problems in which all necessary quantities and conditions are known, they may be guided more by set laws and rules, but even in such cases experience and trained judgment and skill are essential to superior work. In handling live stock it is impossible to follow arbitrary rules and get the results the rules anticipate with the uniformity that would justify such use of rules. The poultry feeder has to learn by experiment and observation how much to feed and when and how to vary his rations.

Nothing Hard About It.

From what has been said of the composition of the common grain foods, and of the functions of appetite and the capacity of the system of the fowl to adapt the food given it to its requirements, the reader may see that experiment and observation on poultry feeding do not necessarily mean intricate and puzzling processes. On the contrary they are simple and easy, requiring only very ordinary attention, just such attention in fact as must be given to any process or work requiring some exercise of judgment.

The greatest obstacle to learning to feed poultry well is that so many amateurs are wholly self trained, and are taught through books and papers, and such teaching and training cannot be anything like as effective as personal instruction. In addition to this the poultry keeper who begins in mature life to learn poultry keeping, and who is trying to learn and to make it pay at the same time, feels the effect of his errors and inefficiency much more than does one who learns while working for someone else. That is one reason why I always urge people going into poultry keeping to begin in a small way and increase very slowly. It takes time to acquire skill in feeding, and it is terribly expensive to practice on large stocks of fowls.

Another thing to consider is that the results of feeding are sometimes dependent upon or affected by circumstances which the novice either fails to see as in any way related to the feed-

ing problem,—or does not see in their true relation to it. Not infrequently the methods he adopts make good feeding difficult, and sometimes some little peculiarity in a person's way of managing his fowls will, when discovered, account to the experienced adviser for continued poor results. Such peculiarities and trifling errors are very hard to locate through correspondence.

Leave Out "Original" Ideas.

In general I think that a large part of the difficulties of amateur feeders may be traced to some "original" ideas or combinations of methods that they have introduced into their poultry keeping. To me the easy assurance with which novices in poultry keeping go about the improvement of methods recommended by experienced poultry keepers is a never ending puzzle. How few of them are willing to take simple instructions and follow them to the letter!

Still, to be fair to the novice, I must admit that a good deal of what is written for him about poultry keeping only adds to his confusion, and as those who know the least about it are usually the most positive in assurances of good results if their instructions are followed, and therefore seem to him the best instructors, he is very apt to prefer the less reliable instructors and instruction at first.

If a novice in feeding, (and by novice, in this connection, I mean any one who has not acquired a fair skill in feeding), will follow the method used by any successful poultryman right through, he will generally be getting fair results within a short time. It may be—and often is the case—that there are poor features, or unnecessary features in the methods of the more expert poultryman. As to this, the novice should not attempt to judge, or if he forms an opinion, should not make it the reason for a departure from the method, but should learn from some one of more experience whether the change he contemplates would work well.

Having adopted general methods of caring for fowls and of feeding which have given such satisfaction to some others that we may call them "tested" methods, the novice should direct all the attention he gives feeding to making a success of feeding by that method.

Let him remember that whatever method he may try will give him the results he seeks only in proportion to the skill he acquires in using it. There are many good methods—many tested methods of feeding, but his skill is as yet undeveloped and his capacity untested. If he changes methods he simply begins over again, and many a time when success comes by some method of feeding adopted after a brief trial and rejection of several others, that success is not due to that particular method of feeding alone, but is the result of the whole experience acquired, and would almost certainly have been attained sooner by persistence in the first method adopted.

"Practice Makes Perfect."

Take any good method (there are many of them) and learn to use it. As far as the instructions given are definite, try to follow them to the letter. Where they tell you to use your judgment, but give as they usually do, some statement of what should be about right, begin by using these approximate instructions and follow them until you have reason to suppose that some variation from them should be made. Then make the variation slight. For instance, in feeding fowls what is called "a full feed" of grain, the amount an average laying hen will take is an ordinary handful—not a heaping handful, but what one would grasp in the hand with the hand closed enough so that even if turned over only a few grains would fall. This is a rough way of measuring grain, but with practice many poultry men become surprisingly accurate in measuring grain out in this way as they scatter it for the fowls. They know or should know how many fowls are in each flock. If they expect the grain to be eaten up clean, as when fed on bare ground or very short litter, they give what they think the fowls will clean up. If they are feeding in deep litter they give more—as much more as they think necessary to let the fowls get a full feed of the grain in the time allowed. The judgment as to quantity does not have to be absolutely accurate every time, because as we saw in considering scientific balancing of food elements, the fowl could adapt them to its needs to some extent, so a fowl in good condition will not suffer if occasionally short-fed, for it has its reserves of fat to draw upon. Also the few

occasionally over-fed is not injured by it. If the feeder "is onto his job" he quickly notes that the food is not eaten, or if it is eaten the appetite is poorer at the next meal, and he feeds short for a meal or two, or perhaps omits a meal, and the fowl is soon feeding right again.

Feeling the Way.

To go back to the novice, if feeding what he estimates to be the average amount his number of fowls should get, they are in good condition and laying well, he may reasonably conclude that he is feeding about right, and keep right on giving that quantity.

If the fowls while in good condition, bright and hearty, do not lay well, the natural conclusion is that they need a little more food, and the ration should be increased. In such a case as this it is advisable to handle the fowls to ascertain just what condition they are in. If rather thin in flesh it is better to increase a little on every feed. If in pretty fair flesh it may be better to increase only on one meal each day,—for if fed too heavily they may fatten instead of beginning to lay as desired.

If hens begin to show lack of appetite, and "go off their feed," the rations should be reduced, and if a mash is fed it is best to make the principal reduction in the mash, for that is the meal that they get with least effort, and exercise is one of the best restoratives of condition and appetite.

When in doubt the novice should reread his instructions, and if he fails to find in them information that seems to suit the case, should not hesitate to ask questions. He should also try to make himself a good judge of food stuffs, for often the quantity to feed depends to some extent on the quality of the feed. Thus in feeding wheat I discovered a number of years ago what doubtless hundreds had discovered before, and thousands since, that hard wheat fed further than soft, and that red wheats, being generally harder, were more economical poultry food than white wheat. Again, in feeding damaged foods, one must sometimes make allowance for the damage; and, in feeding wheat screenings containing other matter, must estimate the amount of waste and feed accordingly. Also in feeding mashes; though a bulky mash fills the crop up more quickly, it must be fed more freely than a rich concentrated mash, when the intention is to make a full feed of the mash. If we suppose that the feeder makes generally what we may call a standard mash, and that in feeding it he allows one large iron spoonful to two fowls, if he makes a more bulky mash, that is, a mash with a larger proportion of such bulky and not highly nutritious stuffs as bran and clover, he must allow more. If he makes a highly concentrated mash with a large proportion of corn meal and of beef scrap or other meat, he must feed less than the usual quantity, for his fowls accustomed to cease eating when the crop has reached a certain stage of distention, are very apt to eat at first just as much bulk of the concentrated as of the ordinary mash. If they are of robust digestion it may not hurt them any. If they are not he may quickly have some bad cases of indigestion on his hands.

In using the bulky mash he may find that the fowls will not eat more than their usual bulk allowance of it, and if this is the case, and if it is necessary that they should get the same nutrition as before, he must increase on some other feed. As the reader may have guessed from what has been said, giving the mash more bulk is one way of satisfying the appetite of fowls without giving them more nutrition than they need. The occasion for this depends on the eating habits of the fowls, which vary as much as the eating habits of people.

The Three Prime Factors.

It would be possible to make a very long article of this, and then not have considered more than a very small part of the possible illustrations of adjustments of feeding. From what has been said I think most readers will see that the important factors in feeding fowls are common sense, familiarity with food articles and with fowls, and practice; and that the feeding of fowls is not a matter requiring special academic education, and familiarity with technical terms and scientific methods, but a simple, every day process in which a person of very limited education and utter ignorance of "science," as it applies to poultry feeding, may become highly proficient, and in which, in fact, the most successful feeders are men and women who give no attention to scientific expositions of feeding problems.

LESSON XV.

Poultry House Fixtures.

THE necessary fixtures of the poultry house are:

1. *Roosts—with or without droppings boards.*
2. *Feed troughs, boxes or hoppers.*
3. *Drinking vessels.*
4. *Nests.*
5. *Receptacles for grit, shell, etc.*
6. *Dust boxes—in houses with board floors.*

A poultry keeper may find places and use for all the articles enumerated, or he may get along with only a few of them. He may have his few fixtures simple and inexpensive—or may make the furnishing of his houses quite an item of expense when compared with the cost of the house and the value of fowls kept in it and of their product. He may make all fixtures himself, may convert old articles and utensils of various sorts to uses as furnishings for his poultry houses, or he may take his choice of ready made articles that run from plain to elaborate in construction, and from moderate to high in price. On a large plant there is a decided advantage as well as appropriateness in having the fixtures uniform throughout the plant. The poultry keeper works faster and easier when the same operation is to be performed in the same way all through. On a small plant it does not make so much difference, yet uniformity is always attractive. On the score of appearances, too, the fixtures should be in quality in keeping with their surroundings. Shabby or makeshift fixtures may not look at all out of place in a cheap, roughly built house, but they do look most decidedly misfits in a house with some pretensions to fine finish. On the other hand, fine fixtures do not go well with very plain houses.

The fixtures for a well finished house need not be elaborate. It is possible to have them simple and plain, yet well made and neatly finished, and quite as inexpensive too as rougher articles of the same pattern; and, all things considered, the poultryman is wisest who plans his house and provides his furnishings with an eye to simplicity, for complicated plans and elaborate fixings make it harder to keep a house clean, and make harboring places for the vermin of various kinds which infest poultry houses.

Droppings Boards.

In the list of fixtures roosts are mentioned as with or without droppings boards. The need of the droppings board will depend on the methods of the poultry keeper. If he keeps his house close and finds it advisable to remove droppings daily, or every few days, he will find it more satisfactory to use droppings boards. If he keeps his house open, and can allow the droppings to accumulate under the roosts as long as they make no odor, he should leave out the droppings boards.

Some of the farmers of Rhode Island divide the floors of their poultry houses in the middle, (the roosts being at one end and the door at the other) by a board set on edge. A cart load of sand is put in the half next the door in the fall. At intervals through the winter a few shovel-fulls of this are scattered over the droppings on the floor at the other side of the board. By spring all the sand has been moved, and is mixed with the accumulation of droppings for the entire winter, and the compost is carted off at the convenience of the farmer.

In these houses the roosts occupy about half the house. In the ordinary poultry house the roosts, according to number, extend two to three feet from one wall, usually the rear wall. Many poultrymen put a board on edge just in front of the roosts to keep the droppings from being scattered over the floor and the litter in front out of the droppings, and allow the droppings to remain for weeks without removing. If the droppings are of normal consistency and the earth of the floor or an applied absorbent takes care of the moisture in them, and if the house is thoroughly ventilated, there is no objection to this. But if droppings are soft and watery, or any fowls are sick, or if either for want of proper absorbents or lack of ventilation the smell of the droppings becomes objectionable they should be removed. To have stated times for cleaning up is well, but the poultryman should remember that his rules are made for the degree of cleanliness he wishes to preserve, and that the prime thing is to preserve that degree of cleanliness. He should clean as often as necessary. His rules merely represent what his general practice determines is necessary.

The board in front of the roosts may be left out and the hens allowed to scratch the litter back over the droppings. This is the practice that I prefer. The droppings will not be worked forward to any noticeable extent on a littered floor, for the hens scratch mostly away from the light, and pile the litter up at the back of the house. The coarser litter may be thrown forward with a fork, leaving finely broken stuff to mix with the droppings, and the mass may lie for weeks without any odor from it being discoverable. In very steady cold winters I have let the droppings lie four months. In warmer winters have found it necessary to remove often, but rarely oftener than once in four or five weeks.

If droppings boards are used they should have smooth upper surface, be wide enough to receive all droppings from the fowls as they sit on the roosts, and unless they have an unusually wide margin would have a strip on the front edge to keep droppings from being scattered. The droppings board under a single roost should be 20 to 24 in. wide; under a double roost 30 to 36 in.

The board should be 8 to 10 in. lower than the roosts. It is generally placed level. Occasionally it is made on an incline to allow the droppings to roll off, but most poultrymen prefer to clean the droppings from the level board. If droppings are soft it is necessary that boards should be kept well sprinkled with some absorbent such as dry earth or sand or land plaster; coal ashes and airslaked lime will answer, but the articles first mentioned are better.

If the manure is to be sold for tanning purposes no absorbent can be used on the boards, and as they quickly become saturated with the water from the droppings, the droppings boards in houses from which manure is saved for tanning are often repulsive in appearance even when supposed to be clean.

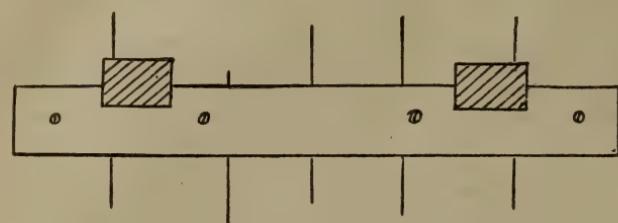
Roosts.

The roosts in a poultry house should be all together, all on the same level, and as low as may be without depriving the fowls of the use of the floor space below them. The old ladder-like arrangement of roosts was a bad one. The fowls would crowd for the top perches, crowd each other off, and in such accidents and in jumping from the upper roosts in the morning many fowls were injured. Usually one or two roosts the length of one side of the apartment are all that a pen of fowls require. The Rhode Island farmers alluded to above have roosts in half the house, but their fowls are expected to be out doors most of the time, the snow rarely lying long there. The conditions in their houses when the hens are occasionally snow-bound are not the best.

The form of the roost is not of as much importance as many suppose. The primitive roosts were round poles, and some still insist that they are better than squared roosts. Evidence to support this proposition is not abundant. Wide flat roosts, three or four inches wide, seem to

give the best general satisfaction, though a good many use roosts only two inches wide and either flat or more or less rounded on the upper side.

Whatever the upper surface of the roost, it should be thick enough to sustain the weight of the fowls without bending or breaking. An inch board will answer for short roosts, or for roosts for light fowls up to about 8-foot lengths. For heavy fowls a roost 8 ft. long and 4 in. wide should be quite 2 in. thick. A roost of such dimensions and length needs support only at the ends, but longer roosts should have support in the middle as well. The roost should be strong enough and its supports such that it remains level and firm when filled with fowls. A roost that sags is likely to break, and some of the



Strip Attached to Wall to Support Ends of Roosts.

fowls might in such event, be badly hurt. Besides the sagging, springing roost is most uncomfortable, as any one may discover by watching the fowls on it.

For supports for roosts we have quite a variety. I use at the ends simple strips as shown in the cut, with notches in them to hold the roosts in place. These strips are fastened to the walls with screws, and are easily taken down when the house is cleaned. In fact all the fixtures in my houses are such that a compartment can be stripped bare in a very few minutes, a matter of considerable importance when fighting lice.

Just here let me say that with reasonable cleanliness and healthy hens given opportunity to dust themselves, I have never had any trouble with lice in the houses. But because of the number of persons reporting it as impossible to get rid of lice though they were very thorough in treating the premises with that end in view, I did, several years ago let my buildings get literally alive with red mites. Then stripping them of fixtures, whitewashing the walls, and using insecticides on roosts and nests, I had no trouble in clearing the premises of mites in short order. The way the houses were built and furnished made the work easy. I would not care to take the job of cleaning some houses I know of mites.

For a middle support for long roosts I use a similar strip attached by one end to the rear wall, and by the other to a strip hanging from a rafter.

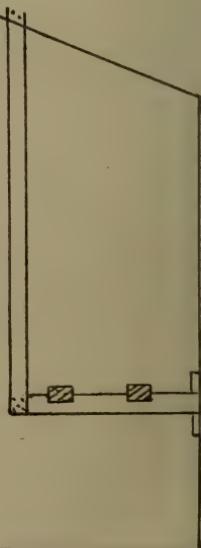
There are several styles of roost brackets, (all I believe of the anti-louse type, with oil cups attached), on the market that are very good.

Some poultrymen attach the roosts to strips which hinge to the rear wall, so that the two, or more, roosts together swing back against the wall during the day.

Where droppings boards are used the roosts may be attached to the walls as just described, or may rest on the droppings boards. Various kinds of iron and wooden legs or standards to support roosts above the droppings boards have been devised. I think it may be said that in general the supports from the board interfere more or less with the removal of the droppings, especially when the ends of several roosts rest on the same support.

So far we have been considering only plain straight roosts. Quite a number of ingenious

Method of Supporting Long Roosts at Middle.



arrangements designed to prevent crowding on the roosts have been devised and reported as highly satisfactory, but these rarely take with any but the inventors. In fact, I could not now name a single one that had gained any popularity. There is rarely serious crowding on the roosts if roost room is ample and the roosts on a level. Give fowls an allowance of a foot, or quite that, of roost room each, and you will have little trouble with crowding. As hens sit close on the roost they don't occupy so much room, but some allowance must be made for opportunity to shift positions and get up and down.

Feed Troughs, Boxes and Hoppers.

Most of the feed troughs used are very simple. The accompanying cut shows cross sections of the styles most commonly used.

The V-shaped trough and the single trough with low straight sides are oftenest seen, but I think the double-reversible trough with straight sides is the best of all. Its superiority is marked on a large plant.

Many different patterns of troughs have been devised to keep the fowls out of the troughs and to keep them from crowding while feeding. Some of these are shown in accompanying illustrations. I have used a good many such troughs, but went back for good long ago to the open troughs as much easier to feed in.

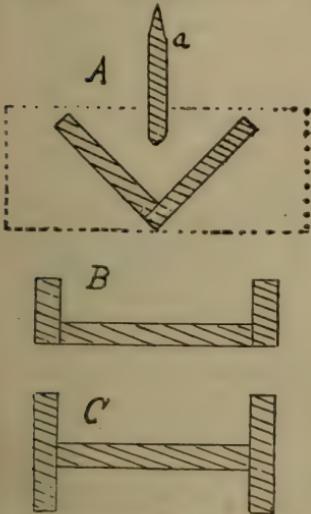
I discovered accidentally a few years ago that it was much easier to feed fowls in short wide troughs than in long narrow ones. I needed some additional troughs, and being pressed for time, thought I would make shift for awhile with a few of the shallow boxes in which small potted plants are sold, which I happened to have on hand. These boxes are about 1 foot wide and 16 to 18 in. long, the sides being about 2 in. high. I allow one such box to 8 or 10 fowls, and find that with the boxes a few feet apart I can throw or drop mash into them from a spoon or shake it from the pail much easier than into narrow troughs, and do it so quickly that the flock is fed before the crowding begins. I am still using some of these boxes and some narrow troughs, and the advantage of the wide short trough seems as plain as ever. Though I have not tried it, I think a box a foot square would answer for just as many hens as the oblong boxes I have. Occasionally when feeding a flock

of chicks I find that they have outgrown their trough accommodations. I give them some mash in the earthen saucers I use for water, if those happen to be

empty, and I notice that nearly half as many chicks as are pushing and crowding around a trough three or four feet long, will feed comfortably and quietly in a circle around an 8 in. saucer. The reason is easy to discover if you watch the chicks for a few minutes. At a long trough the fowls and chicks are constantly changing positions. At a short box or round pan all the food is within reach of all the fowls about it at the same time, and there is no inducement to move.

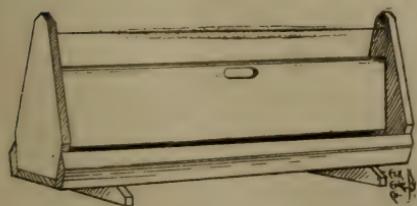
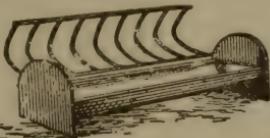
Protected Feed Troughs.

Sometimes the feed trough is attached at one end by a hinge to the wall of the house, and when not in use is raised and secured in position against the wall. The advantage of this is not



Cross Sections of Feed Troughs.

A v-shaped trough, *a* board fixed on edge to keep fowls out of trough. B shallow box trough. C double or reversible box trough.



as great as would be supposed, for dirt and litter collect between the trough and the wall, and when the trough is let down a good part of the dirt is likely to drop into the trough, necessitating raising it again to allow this dirt to drop out. Taking one thing with another, more poultry men prefer the loose trough, and though some hang the troughs up on pegs or large nails when not in use, more leave them on the floor all the time.

A fixed feed trough in or next the passage is sometimes used, but this arrangement is quite

rare, and I have seen more than one plant in which it had been installed where the feeding mash was fed in movable troughs in the pens.

For feeding dry grains in bulk, and ground feed stuffs dry self-feeding hoppers are much better than troughs, and if feeding is regularly done in this way hoppers should be used. The illustrations show different methods of constructing hoppers. The size required depends on the size of the flock and the frequency of feeding.



Fig. I.

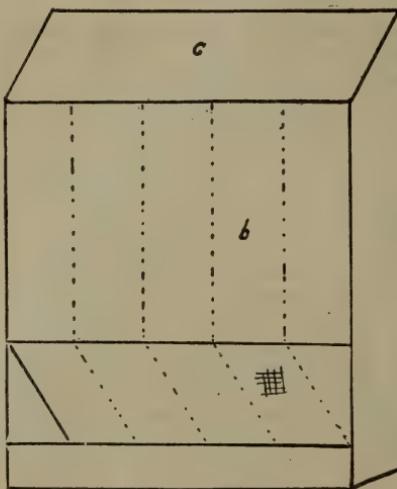


Fig. II.

Dr. Nottage's Hopper for Dry Feed—Five Compartments.

Fig. 1—Cross Section. Fig. 2—Front View.

ing. Some poultry keepers keeping hens on the colony system, with free range, use hoppers large enough to hold a bag of grain.

Drinking Vessels.

Of these there is a great variety made especially for fowls, and a still greater variety made for other or general purposes are used for drinking vessels in the poultry yard.

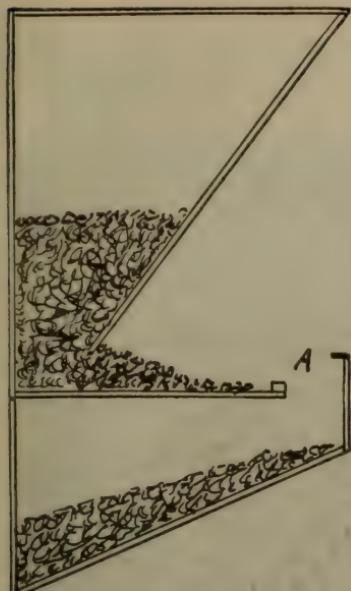
Of the drinking fountains made especially for poultry, some are stone ware; some of earthenware; some of metal, usually galvanized iron. Most of them are of the self-feeding pattern, a receptacle for water over a shallow pan into which it feeds by pressure, keeping the pan full as long as the water in the reservoir holds out. Some have reservoir and saucer in one piece, others in two pieces, that they may be separated and more easily cleaned.

While a great many such drinking fountains are in use, the greater number of poultrymen seem to prefer an open vessel, at least for adult fowls. For chicks perhaps the majority prefer self-feeding fountains with shallow pans into which the chicks cannot get. These fountains too are better for fowls having large crests and beards or combs and wattles.

For an open drinking vessel for fowls or good sized chicks, almost anything that will hold the required quantity of water will answer. I use mostly 6 qt. wooden pails, but have a galvanized iron pan or two, and one old porcelain lined open kettle. On one of the largest plants in this vicinity all the drinking vessels are porcelain lined iron kettles holding about a gallon each. On another plant stone jars of about the same capacity are used. On a farm I visited a few years ago, I saw shallow cast iron pans, as I remember about 2½ or 3 in. deep and 8 in. square, which the owner had had cast at a nearby foundry for that purpose. The cost was I believe about 15 cents each, but after this lapse of time I would not say positively.

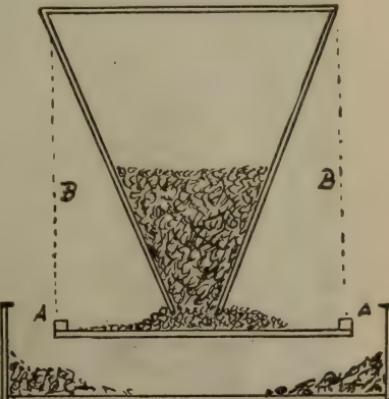
As between closed and open drinking vessels the latter seem to be preferred by most poultry keepers, except as noted above. Theoretically and in the eyes of the novice the covered

vessel is better because it is supposed to keep the water cleaner. Practically the open vessel is easier to keep clean, and further is less dangerous to the health of the fowls when not absolutely clean, because air and light, the great purifiers, get into it as they do not into a closed vessel. An objection some—mostly novices—make to the use of open vessels is

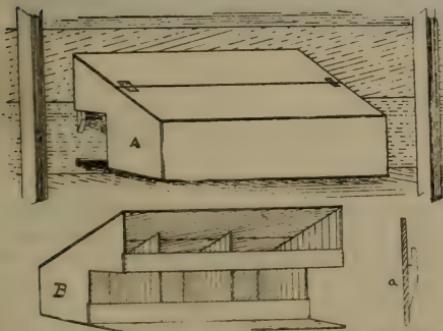


Hopper for Fowls.

Anti-Waste Feed Hoppers Designed by Subscriber to F.-P.



Hopper for Chicks.



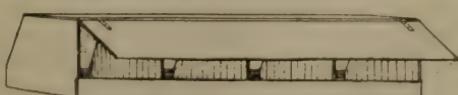
Dark Nest to Hang on Wall.

A—Exterior View. B—Interior View. a—block to hold nest in place.

than necessary to keep them from being easily upset, very little droppings will get into them. It is the wide shallow pan that catches the droppings.

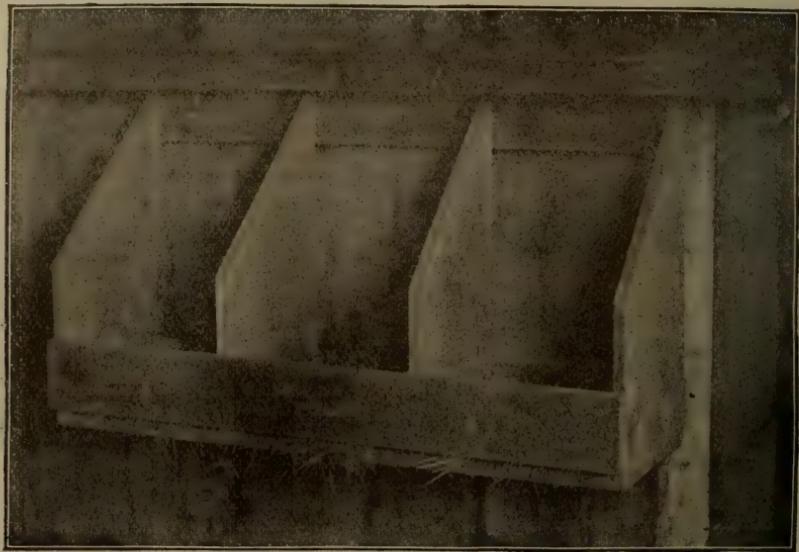
Nests for Laying Hens.

Number of Nests Needed.—The old method was to provide almost as many nests as there were hens in the flock. Indeed I have before me an old drawing of a model poultry house for twenty-four hens in which there were twenty-four nests. It was early observed and continues to be observed, that no matter how many nests are provided, the hens usually all go to a certain few of the nests, and rather than lay elsewhere will crowd on those nests or sit near them waiting their turns.



Dark Nests to Go Under Droppings Boards.

Most poultry keepers still continue to provide many more nests than are used. I find a nest to every five or six hens enough, and have often allowed only one nest to seven or eight hens, say three nests in a pen of twenty to twenty-five hens, and found the allowance satisfactory, even when the hens were laying well. That, however, depends on the flock. Sometimes all the hens in a flock are quick layers, again they are slow to very slow, or the laying habits of the



Triple Set Skeleton Nests in Place in Poultry House.

hens are very uneven. So I allow as a rule one nest to a pen of three or four hens, two to a pen of six to twelve hens, and from four to six to a pen of twenty to twenty-five hens, according as they seem to need them.

Styles of Nests.

The nest boxes should be movable. Whenever more than one nest is necessary it is customary to make the nests in sections of two or more. Sometimes these are built under the droppings board, but even here the construction may and should be such that the nests are easily moved and taken out of the house for thorough cleaning and airing.

It has been a very common practice to make and place the nests so they would be quite dark. This is done in part because the hen is supposed to prefer a secluded place to lay, and in part to prevent the development of the egg eating habit among the hens.

To economize floor space as much as possible, it is customary to place the nests on the wall several feet from the floor; or if they are put under the droppings boards, these are usually placed high enough to allow the hens the use of the floor below the nests, though sometimes in a house with low north wall and roosts next this wall, the nests are on the ground, with the droppings board forming the top of them.

Leghorns and other high flyers will go as a rule to the highest nest accessible. I once nailed a small box in a corner close up to the roof in a pen of Silver Dorkings, and all but one or two very heavy hens would go to that nest though there were others more accessible. Hens of the larger breeds will often go to the corners on the floor of the poultry house to lay, no matter how many or how attractive nests are provided for them elsewhere. It is very difficult to break hens of that habit. In many of them it is hereditary, and the best thing to do is to either put a box — a common soap box is good — on the floor in the corner, and let them use it for a nest, or by fastening a nest to the wall a few inches from the floor try to



Double Skeleton Nests.

The nests as photographed were attached to an outer door to get full light and a position that would show construction. This frame is 12 in. wide; 28 in. long. Ends 10 in. high in front, 18 in. high at back. Front strip 4 in. wide; 2 back strips 2 in. wide.

ites, but go to one as readily as to another. When a hen finds one nest occupied and the next vacant she almost always steps promptly into the empty nest. Just why she should do this I cannot say, unless it is because the divisions between the nests being so low in front, as long as she remains perched on the edge of the nest the empty nest is right before her eye.

The nests in most of my houses are on the side wall or cross partition near the front where they get the full light, yet I have not found the hens more disposed to go to the corners of the house to lay than when I tried to humor them by giving them secluded nests, and I have had very little egg eating in them. I find eggs broken, but not touched many times oftener than I find evidences of broken eggs having been eaten.

It would be premature to consider any general principle or fact as proved by my observations on these nests, but I am inclined to think that in trying to devise an easy nest to clean I inadvertently stumbled on a point which is of some use, i. e., that the nest on the floor, entered from the floor, and the nest with running board in front to accommodate the hens, are the great encouragers of egg eating, because in such nests the hens have better opportunities to spy out the condition of things in the nest, and also the waiting hens have a better vantage ground from which to quarrel with the hens in the nest than in nests like these, or boxes nailed to the wall. The hen in this nest has all the advantage of position.

My nest boxes are made with the bottom a little narrower than the ends, and the strips next it on front and back are placed about half an inch from the bottom edge of the end and division pieces. This leaves a space too narrow for an egg to go through, yet wide enough to

induce them to lay in it. After they begin to lay in this nest it may be raised gradually from the floor until it is at the usual height. Some hens, however, will make their nest on the floor as near the corner as they can, no matter what arrangements are made to tempt them to do otherwise, and all that can be done with them is to put a low box in the corner so that the eggs will not be rolled out or covered up.

For several years I have been using nests reproductions of photographs of which are shown herewith. These are my own design, and as far as I know none like them are in use except such as were made from them. I like them better than anything I have used, and poultrymen who see them seem to take to them. The object was to make nest boxes that were as near skeletons as possible, easy to keep clean, and easy to knock apart for thorough cleaning if that seemed necessary, and put together again. In use in my houses these nests have seemed to have some desirable effects, some good points which I had not anticipated, chief of which is that with them the hens seem to have no favor-

ite, but go to one as readily as to another. When a hen finds one nest occupied and the next vacant she almost always steps promptly into the empty nest. Just why she should do this I cannot say, unless it is because the divisions between the nests being so low in front, as long as she remains perched on the edge of the nest the empty nest is right before her eye.

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drop through any nest material or dirt that cannot be easily lifted out with the hand. There are in these nests no corners formed by three sides, no places for dirt to mass and collect. The nests can be cleaned inside without removing them, or detaching any part of them.

Receptacles for Grit, Shell, etc.

Where supplies of all these accessories are kept constantly before the fowls, the best way to do is to have self-feeding hoppers with as many compartments as there are articles used. Usually there are three—grit, shell, and charcoal. I use only shell, and for it have small boxes nailed to the wall near the door in each house, just high enough from the floor to let the fowls get at the contents easily. If I had more fowls or used more of these accessories I would use hoppers for them, but we have old butter boxes more than enough for the purpose, so what's the use of buying or making hoppers?

As to the use of these articles: Shell is generally agreed to be indispensable. Grit and charcoal are so considered by the majority of poultrymen, but I am free to say that in my own yards I have never found any advantage in the use of charcoal. I used a good deal years ago, quit because I could see no benefit from it, and have never been able to see that my fowls suffered for want of it. Advocates of charcoal with whom I have discussed this will insist that the fowls would be better for it, but that is begging the question.

Grit I used with shell until a few years ago, and quit it because I found that when constantly and liberally supplied with shell the fowls hardly touched the grit.

I would not conclude from my experience that no fowls needed grit and charcoal, but it seems very plain to me that mine do not. Fowls managed differently might, and of course mine might get in condition that would require them. So while personally I discard the two articles mentioned, as I leave out some of the tasks of poultry keeping that are generally done on the "better be sure than sorry" principle, I don't advise anyone else to do so. I merely say that these things do not seem to be always essential, and that if a man can have confidence enough in his own judgment to determine when they are needed, it is not necessary for him to constantly supply articles or regularly perform tasks merely to be sure that he does not err through omission or neglect. Each one can easily determine for himself how much grit or charcoal his fowls will take, and to what extent they seem benefited by them, or to suffer from lack of them.

Dust Baths.

In a house with an earth floor, no special dust bath is needed. Clear away the litter occasionally from a space near the door or window, where the sunlight falls on the floor, see that the earth here is loose, and the fowls will prefer such a place to the old fashioned dust bath. This for winter. For other seasons you need do no more than fork up a little spot here and there in the yards.

Where the houses have not earth floors dust baths must be provided. They may be made by putting a board diagonally across a corner and partly filling the enclosed triangular space with dry earth; or the enclosed space may be square or rectangular in form, two boards joining at an angle which projects into the floor being required to make the two sides of this dust box, or a box with sides and bottom may be used and shifted about as desired.

Failing a supply of dry earth, coal ashes may be used, but their effect on the skin and plumage of the fowls is bad. They take away the oil in them, leaving feathers rough and brittle, and the skin dry, and leave the feet and shanks in a condition in which they are especially susceptible to the attacks of the scale insect.

To add to the effectiveness of the dust bath in ridding the fowls of lice, lime, sulphur, etc., are sometimes mixed with it, and doubtless give it additional virtue, though the dry earth alone is sufficient provided hens have opportunity to use it freely.

LESSON XVI.

Poultry Fences and Yards.

THESE two subjects we have to consider together. The height, and to some extent the kind of fence required depends upon the size of the yard even more than upon the powers of flight of the fowls to be restrained. When fowls are confined to small yards the height of the fences must be adapted to flying capacity, for the fowls so closely restricted in movements will do their best to break bounds. When yards are large the fowls may be restrained with very low fences. I have had fowls that would quickly fly a six foot fence when in a small enclosure so surrounded never even attempt to go over the three foot fence of a larger yard, and I have seen Leghorns in a large yard where, on the side toward the road was a stone wall one could easily step over, that I was told never went over the wall — a statement which I could credit because of what I saw of the fowls in their yard, and did not see of evidences of their having been outside. This, however, we must regard as an exceptional case, and I would not advise anyone to trust to a low stone wall to keep any active fowls out of places in which there was something to tempt them, and where they might do some damage.

The low fence to be effective must be one which offers no inducement to the fowls to try their powers of flight. A fence of pickets or laths presents a top line on which the fowl can secure a footing. A wire fence of any of the styles in common use offers no such resting place if the stakes or posts are small or pointed at the top. This is one point in favor of wire netting. Other points are cheapness, durability, ease and quickness of construction, and adaptation to temporary fencing. This last feature of wire fencing is one that is only beginning to be appreciated. It is most conspicuous when low fences are used, though the high temporary fence may be made with but little more trouble.

The Simplest Fence.

Except for gate posts at the few places where there are gates, and for the fence of the fly of the house built for pigeons, I have no set posts for my poultry fences. All fences are on stakes driven into the ground. When the ground is soft we drive the stake right into it; where hard or stony we first make a hole with an iron bar. It is not necessary, as when using lumber, to have posts equally distant. I generally drive stakes four paces apart, but if at the point marked for a stake I find a stone the bar will not displace, move a few inches or a foot if necessary, either way. Except at end posts or gates the wire for temporary fences is fastened to the posts with only two staples, one next the ground and the other at the top of the wire. These staples are not driven in tight, only enough to hold the wire, leaving a quarter of an inch or more of the staples to give a good hold to draw it out by. For wider fencing proportionately more staples should be used, as the additional weight of wire increases the strain on those near the top. With wire three feet wide and less, the strain on the staples is very light.

Fences built in this way are easily and quickly built, and easily and quickly taken down and put away or moved. For Brahmans I have fences from two to three feet high, preferably two and a half feet. The widths varied because sometimes when I wanted an extra roll or two of wire I could not get thirty-inch stuff, so took what I could get. Two feet is rather low, though only old males are likely to cross it. Three feet is higher than necessary, and a little harder for the poultry keeper to walk over.

For Rhode Island Reds, Mr. P. R. Park uses four foot wire, placing his posts or stakes farther apart (as I recall it about twenty feet). With posts far enough apart the wire will slack enough in the middle to allow one to step over. A man of average height or above the average, not overburdened with flesh, will get around much quicker going over fences this way than opening and closing gates. A gate is a necessity if a wheelbarrow is to be taken through the yards, but even with gates all round it is easier and quicker for the average man to step over the fence—beside the gate. For a short man it is a different proposition.

In this style of fencing there are no boards, no part of the fence tight. The lower wire rests on the ground; where there is an elevation too abrupt for it to follow it will double over, where there is a depression which leaves an opening below it, it may be drawn down close with pegs driven into the ground.

A possible objection to fencing in this way is that males may fight through the fences. Mr. Park's Reds get used to each other, and do little damage. I have had no trouble with Brahmans except in a few cases where males began "scrapping" through the wire, and in a rush and spring together landed both on the same side of the fence. Then the fight was to a finish. No serious fighting through wire netting is possible. This year I had one male I was not willing to take any chances on, and between his yard and the next one containing a male I doubled the fence, the yards joining only for a short distance, and there was no fighting at all. This double fence was made just as the temporary fences I have been describing, with only a few inches between the two fences. Last year where there was danger of males damaging each other, I ran a second piece of thirty-inch wire above the first. The objection to that was that you could not walk over such a fence. The parallel lines of low fence prevent fighting, while not interfering with the method of going from yard to yard. The simple way of fencing poultry just described is applicable only when there is room enough to give good sized yards, and especially wide yards. It will not answer for such narrow yards as are usually used with continuous houses; nor in the limited space in which many must yard their poultry, nor where males with large combs are kept; nor is it advisable for permanent fencing.

If a fence is to remain in the same place permanently it is better to build it, though of wire, more substantially, to set the posts plumb and firmly, to fasten the wire on well, stretching it to fit; and I think it is better to put a six-inch board along the ground, especially if one wishes to keep the grass or the ground smooth, clean and well trimmed along the fence.

About Permanent Poultry Fences.

More and more poultrymen are beginning to agree that the permanent poultry fence is a bad thing—an evil to be tolerated, perhaps, in some places, but avoided wherever possible. It is only when poultry keeping is on a very limited scale, and the poultryman can keep his small yards thoroughly renovated—in fact, treating the yards as he does the house, that the evils of permanent fencing are done away with.

The great fault of permanent fencing is that the yards, unless very carefully looked after, soon become foul, while the fences so interfere with a thorough working of the soil that the soil either is not thoroughly worked or is worked largely by hand tools, and a great expense. The result of this condition is that the yards are generally not thoroughly worked over, and disease and filth lurk in the corners, about the posts, and under the fence boards, furnishing the unsuspected cause for many a supposed mysterious epidemic.

As in discussing the structure of the poultry house and the character and arrangement of the fittings, I tried to impress on readers the importance of having everything plain and simple, because this made it easier to be thorough in treating the house for lice especially—but, also, in all ordinary cleanings—so in regard to the arrangement of yards and fences I

would emphasize the importance, which as a plant grows old becomes necessity, of making it easy as well as possible to keep yards thoroughly clean. It isn't much of a job to spade over a large area on paper; but it takes time and lots of muscle to do the actual work on a comparatively small plant. Even when yards are so arranged that the greater part can be ploughed, there must be a strip along each side of every fence that has to be worked over with spade or fork,—a tedious job.

This difficulty of giving the soil of the yards proper attention is one of the strong arguments against the continuous house plan as an all year round plan. Some poultrymen, notably those growing winter chickens, and some of the large duck growers, use stake and wire netting fences for the outdoor runs connected with their brooder houses, and after the young stock is out of the brooders, take up all fences, plough the ground, and sow to some crop, usually winter rye. This annual renovation and disinfection of the yards has been an important factor in their continued success with intensive methods. It is more easily adapted to brooder house yards than to yards in which laying stock are kept, but unless a poultryman is very much crowded for room, or has a very large stock, it should be possible to get the laying hens out of their permanent or winter quarters for at least a few months in the summer and early fall, and so make an opportunity for a thorough cleaning up and purifying. If the house is so situated that yards can be made both front and back, and used alternately, the problem becomes easy. Temporary fences may be used. Yards in front of the houses may be used for a year or two, then all fences removed to the rear of the house, and the ground in front kept in cultivation or grass for a year or two. The character and extent of the land, and the requirements of the situation, have to be considered in determining just how to work the rotation, and how to arrange the chickens and the crops. On some soils a rapid alternation would be better; on others, yards might run for a series of years without any pressing demand for change. This is especially true of some of our porous, sandy sites in New England. Indeed I have seen some places here where if the land was not overstocked with fowls so that it would get too foul between rains, poultry could be kept on it indefinitely without any other purification of the soil than is brought about by natural agencies. This condition, however, would not obtain if yards were small, and the washing of the soil interfered with by post and boards of permanent fences, beside which the droppings would lodge instead of being carried away.

It is to be observed, further, of such a location, that the fertilizing elements which, retained in a soil unused, poison it for the fowls running on it, being either washed away or dissolved and leached through the light surface soil, are wasted and lost, while with an alternation of yards on richer, heavier soil the fertilizer can be made to contribute something to the income.

I know a very few places on good land where stock has been kept low enough, and grass yards in such good condition that the bad results of permanent fencing have not developed, but most poultrymen who yard their fowls need to change the runs often, or else give as careful attention to the cleanliness of the yards as of the houses.

The Usual Permanent Fence.

The prevailing style of permanent fence for small to moderate sized yards is a fence six feet high, the first two feet of boards, the remainder of wire netting. Posts are usually set eight feet apart. With the wire no top rail is required. The netting is made fast to the posts and to the upper edge of the board part of the fence with staples. For such fencing the common two inch mesh poultry wire netting is used.

Fences on this general plan are sometimes made with lath in place of wire, but that style is not as good or as satisfactory. I used lath fences for the yards of a plant I built fifteen years ago, but after a few years experience with them, resolved never to do it again. My object in using lath was to have the shade which it would give the fowls in summer. It was all right for that, but it also made too much shade in the yards in winter. It would have been better to put for shade in each yard some sort of shelter that could be removed when not wanted. The great objection to a lath fence is that the wind soon works the laths loose, and in a comparatively short time they get to the stage where not even frequent circuits of the fences driving in the nails will keep them in good condition. By all means avoid the lath fence. Use wire, and

If shade must be provided, make shelters of boards or cloth, or plant trees in the yards. The trees answer permanently; the other shelters will do until the trees are of size to make shade. Japanese plum trees have been favorites with poultrymen. They make a quick growth, and for a few years bear well, but are short lived. Some poultrymen have planted plum, cherry, or peach trees, or some of all of these in their yards, alternating with apple trees. The other trees will have passed their prime by the time the apple trees are crowding them out, and can then be taken out, leaving a nice apple orchard.

A six foot fence is not always necessary for small yards. For Asiatics it is higher than required, and is also higher than needed for some American breeds; but if yards are small it is better to make fences high, unless it is certain they will never be used for fowls that can fly. The additional cost does not exceed half a cent per running foot of the fence, and the six foot fence is practically safe for all the popular varieties of fowls, while a five foot fence is not high enough for a small enclosure for Leghorns, and many fowls of all breeds but Asiatics can go over it if they try.

The six-foot fence, while generally safe, will not answer for light, active fowls that have acquired the habit of flying over it. For such various devices have been tried, some of which seem to work in one case, some in another. Rarely the fence is built to a greater height than six feet. Oftener a narrower strip of wire netting is placed at the top of the fence, in a horizontal position, being attached to horizontal strips of wood fastened to the tops of the posts. This wire extends out a foot or more from the perpendicular fence. The object is to prevent hens which have caught the trick from alighting on the top wire of the fence proper. Sometimes instead of wire netting one or more single wires are strung to cross pieces on top the posts, the purpose being the same, to have the fowls flying for the top of the fence strike them and be thrown back. None of these devices are absolutely sure. To be sure of retaining breeding fowls in small yards with six-foot fences the yard must be covered over with wire netting.

In this connection it may be well to point out that flying is with fowls very much a matter of habit. Chicks that are raised where they have no inducement to fly, or where the fences are so high that they could not fly over them until quite well grown seldom get into the habit. Those which find conditions and fences which encourage flying early acquire the habit, and it becomes difficult to break them of it. There are of course some differences due to breed and family, but on the whole fowls kept where the fences easily retain them while small rarely become troublesome as flyers.

Gates.

Gates are usually made like small sections of the fence of which they are a part. Different styles of self-opening and closing gates have been devised, but the old simple gate seems to hold its own. Probably because it is inexpensive and reliable. The hinges are sometimes of springs, or a spring is attached to the gate to shut it, but the poultryman who is wise in his craft will not rely on a spring. A strong breeze often swings a gate which is not securely fastened, fowls slip from one pen to another; there is confusion, annoyance, and often serious loss from such mischances. It is safer to have every gate fastened with a fastening that can be depended upon.

LESSON XVII.

Getting Ready for Winter.

THE ideal state of the work in a poultry yard is to be always prepared—ready for the special work of each season as it comes. When this condition exists, the work is easier, and results more reliable.

We may say in discussing the matter academically that this ideal condition ought always to exist, and that in as much as he fails to attain it, the poultryman shows poor management or poor judgment. But in practice we find even the best poultrymen able to maintain this ideal condition only occasionally, even when their operations are on such a scale that so far as it depends upon them, nothing that needs to be done need be delayed or neglected. When, as is oftener the case, the poultryman is diligently making the most of every promising means of adding to the proceeds of the year's work, a setback making a difference of only a few days in certain preparations or results may easily handicap him through the remainder of the season.

Besides such delays as this, there are occasionally others for which he may not be at all responsible. Of this kind are delays in getting out chicks, due to disappointing fertility in the first eggs set. The effects of such delays may extend through more than one season in spite of all that the poultryman may do to overcome them.

I call attention to these things not to discourage anyone, but because a full appreciation of possible difficulties in the way of any undertaking is nearly always a condition of success in it, and the average poultry keeper is too prone to put off special preparations until the occasion for them becomes urgent. A mistake at any season, such procrastination is doubly dangerous at this season, for fall weather is uncertain, winter may set in earlier than anticipated, and winter conditions often make it impossible to do work that needs to be done. There is less chance of recovering lost ground at this season than at any other. Hence the urgent need of forwarding the development of the stock, and the preparations for winter protection and comfort.

Keep the Young Stock Growing.

There may be some very early pullets that by moving about, and by light diet, need to be held back from laying until October, but the greater part of the young stock should be fed now all it will stand, and it should be able to stand very heavy feeding.

The conditions now are especially favorable to rapid growth. In northern latitudes where excessive heat is rarely long continued, growth should have been good right through the summer. Where summer heats are oppressive, the growth of the chickens may be very slow through July and August, but with September they take a fresh start, and to make up as far as possible they should now be pushed to the limit of safety.

With the cooler weather of this season we have still days that are long enough to get in three good meals, and still have time for the digestive organs to rest a little in the daylight interims. Later when the days grow so short that the meals come closer together the fowls will not take and assimilate as much food, and that is one reason why it is so hard to push them when it is

neglected until the failure of the pullets to begin laying early in winter plainly indicates the need of forcing. Then the keeper is often disappointed in results, the pullets not seeming to respond as they should to the extra food and special care given them.

It is of greatest importance that through the fall the fowls should be well fed. The need of good feeding at this, and at all times, would appear to be so self-evident as not to need to be thus specially emphasized, but for many years, and in the experiences of a very great number of poultry keepers, I have noticed a tendency to skimp the feeding at this period.

The most common cause of such efforts to economize is that the poultry keeper is carrying a stock of growing fowls too large for his finances, and in his efforts to go into the winter with a certain number of possible layers, he not only keeps many pullets which ought to be sold for poultry, but, in order to go no deeper in debt than is unavoidable, he gives his stock a mere maintenance ration, which, in the case of the pullets, means delayed development, and in the case of the old hens, slow molting and retarded resumption of laying. The policy of short feeding is often pursued until the lack of results at the expected time points to something wrong, and then the poultry keeper expects in a few days of special feeding to make up for weeks or months of insufficient rations.

It may happen occasionally that it is advisable to feed short with early pullets that would otherwise begin to lay sooner than was advisable, (with the risk of a molt early in the winter), but such cases are comparatively rare. Most poultry keepers with most of their stock need to feed all the stock can stand.

The Best Way to Economize in Feeding.

The expense of feeding a stock of growing, and, as yet, unproductive pullets, is nearly always a heavy burden on the poultryman working up a stock, because the proportion of unproductive to productive stock is usually much greater than in a flock established for some time upon a given basis. To make the burden as light as possible, the poultry keeper should cull his pullets closely, retaining only those that are vigorous, strong, and well developed for their age. If, after such culling, he still has more than he can give proper care, let him sell a part of the remainder, and bring the stock down to what he can "swing."

Many poultrymen are reluctant to do this because they feel that in thus reducing their stock in advance of the season of its productiveness they are deliberately cutting off a large part of the most promising source of income. That would be the case if the pullets were all good, and if the whole number could be carried to maturity in a proper manner. I am not, however, talking now to those who are able to keep the pullets growing, but to that large class who try to economize in feeding at this season, and then wonder why they do not get results a little later. The most profitable course for them is to reduce the stock to what they can give liberal rations. It is a great deal better for one who is sailing close to the wind in his poultry business to go into the winter with 100 pullets ready to lay in November than with 300 that will not lay until February. For the 100 will give a profit all winter, while the 300 will not begin to pay for their keep by their winter laying. In sections where eggs command high prices through the most of the year, one may make perhaps as much on a flock of late pullets beginning to lay in February, and laying late the next year, as on earlier pullets that began to lay at the same age; but if he needs the income from the hens to pay his feed bills, and has to go into debt if eggs are not forthcoming, he should strain every nerve to get eggs early, and keep no more pullets than he can carry without seriously handicapping next year's work if eggs come slowly this winter. If one has room for them, and is able to handle them, late pullets may be very profitable. Not so the early pullet that lays late.

Keeping the stock down, or cutting it down at this stage, is one of the essential features of building a poultry stock or business up slowly. Just as many readers in mid-summer found that it had been easy to get out chickens enough to overcrowd their accommodations before the chicks were half grown, so about this season many are made to realize that they have been able to rear to present stage of development, and have accommodations for more chickens than they are financially able to take care of until they begin to produce eggs. The common practice is to go in debt for feed, and even then feed short. The better way is to reduce the stock.

Culling the Young Stock.

Apart from the point of a poultryman's financial ability to carry what stock he has, is the question of the policy of keeping it all. Nearly all poultrymen—even those of long experience and generally satisfactory success, hold more of their stock than is wise.

Unless a stock has been bred by very careful selection, and is very uniform in quality, there is almost certainly a considerable percentage of both pullets and cockerels not worth-reserving for stock purposes. The very backward inferior specimens of both sexes should be relentlessly weeded out. There is no profit in keeping them. The novice who has thoroughbred stock is likely to think that all being of the same breeding, every specimen must have some value for stock purposes. The inferior pullets he has no use for himself he holds to sell to some one who wants low price stock. They are salable for such purposes if the price is made low enough, but I don't think that in the long run it pays to make such disposition of them. If one is selling thoroughbred stock and wants to make a reputation that will profit him in coming years he cannot afford to let such poor stock go for breeding, at any price—much less at a low price. Cockerels of like quality he holds to sell to the trade that buys at \$1.50 to \$3 each. Neither does this pay. Considered individually, there is some profit in the cockerel sold before spring at \$2.50 to \$3, but on a lot of cockerels of low grade it is generally impossible to figure a profit that will pay for giving them house room and attention. A few birds lost or unsold in such a lot offset the narrow margin of profit on the others. The novice with no established trade will as a rule find it safe to dispose of all but the best tenth of his male birds before winter. This will seem to many rather radical culling. Let those who doubt the wisdom of such policy keep account with the cheap cockerels they hold over. As to selling any considerable proportion of cockerels of that grade at this season, it cannot be done. The trade that takes them is on the whole a trade that buys only at the beginning of the breeding season.

If, then, the reader wishes to put his poultry keeping for the winter on the best possible economic basis, let him dispose of all pullets that are not thrifty and vigorous and likely to begin laying before midwinter, and of all but a few of his best cockerels. These with such old hens as he has selected to keep over should give him a stock that reduces his chances of loss to the minimum, while what he receives from the sale of the discarded stock may go a good way toward paying the keep of the remainder until it begins to be productive.

Putting the Stock Into Winter Quarters.

The pullets not already in winter quarters should go there as soon as possible now, for their laying will depend somewhat on conditions being good, and no further disturbance necessary.

They should not be crowded, but given as much house room as is to be allotted to them through the winter. It is generally found a mistake to crowd them into winter quarters, perhaps to twice the capacity of a house, thinking it will be time enough to reduce the number when they begin to lay. They should have as much house room now as when matured.

The Importance of Fresh Air.

To say that pullets should now be in winter quarters does not necessarily mean that the houses should be operated as in winter. If cold houses are used there will be no difference, perhaps; but if the houses are tight, warm, and are to be shut up in cold weather, the winter method of operating the house is not suitable to present conditions.

This is the season when colds seem to develop and become epidemic without such plain causes of colds as may be found later on. Most of the cases of epidemic cold developing now are due not to cold, but to heat. The houses are shut up too early, the air in them is close and bad, and the fowls and chickens accustomed to more open coops and houses during the summer, take cold. For years there has been hardly a case of colds reported to me in early fall that was not evidently due to lack of ventilation and fresh air, and reports of results of better ventilation have almost invariably shown improvement as a result of the more air treatment. Better keep doors and windows open until real winter weather comes.

Making Houses Ready.

While it is better to have houses in first class shape, clean, and the floor (if of earth) renewed, when the pullets are put into them, it is much better to put the pullets in the houses, and fix up afterwards than to keep them out until the houses are ready, especially if (as is quite generally the case) the pullets are by this time overcrowded in the summer quarters. The ideal way, as has been said, is to have everything ready at its proper time, but this is so difficult to accomplish that many times we have to take the course that seems to have the least disadvantages.

When detached houses are used it is much easier to clean up while the house is in use than when houses are on the continuous plan, but even in that case with a little ingenuity in shifting the fowls from pen to pen as cleaning progresses, the fowls being driven and not handled at all, it is possible to do the work almost as expeditiously as if the houses were empty.

With me the cleaning process consists in removing all of the earth floor that shows any mixture of droppings, brushing down walls and underside of roof with a broom, filling the floor with new earth, and making whatever repairs are necessary. Sometimes the interior is whitewashed, though that seems to me generally not to be necessary for cleanliness, but rather advisable because it makes the place look better, and makes the light better on dark days. These advantages make whitewashing well worth doing if time can be found for the work, but if something has to be left undone, let it be the whitewashing rather than the renewal of the floor, repairs, or alterations that will make the winter's work easier.

Look Out for Mites.

When cleaning up the house look out for red mites. They are most likely to be found on the undersides of the roosts, and about the supports on which the roosts rest, and about the nests. If they are present, indications will be plain, even before the mites themselves are seen, in the abundance of greyish white specks about their harboring places. If these specks, resembling fly specks, are noticed on walls or fixtures, you may be sure the mites are there. In that event, whether the house is to be whitewashed or not, give all the places where traces of mites are found a thorough swabbing, spraying, or drenching with water containing an insecticide that will kill them. I use Chloro-Naphtholeum, about a half teacupful to a three gallon pail of water. Some use Sulpho-Naphthol, some naphthalene flakes dissolved in kerosene, some straight kerosene, some one of the numerous other liquid insecticides and disinfectants on the market. Whitewash alone will kill all the mites it reaches if a bit thick, but if thin enough to go into the cracks and crevices is not as effective as the other things mentioned. Whatever application is used, if the mites were bad go over the infested places again after an interval of three or four days, and again after another like interval, if, on examination, any mites are found. Two, or at most, three treatments at this season should settle the mite question until the return of warm weather next summer.

Renovating the Yards.

The yards being, in this latitude, little used in winter, it is not as necessary to clean them up at this time as it is to clean the houses, but if opportunity can be found now to turn over soil that would require turning over in the spring anyway, it is worth while to do it. The contaminated soil is thus turned under, and if there should happen to be much open weather in the winter the fowls have cleaner ground to run over.

If it is desired to grass a yard, now is a better time to prepare it than in the spring. Plough or spade and smooth the surface. Then just before it freezes up sow the seed. Keep the fowls off the land through the winter and until after the grass is well established in the spring. In this way you will get a better start of grass, and have the use of the land much sooner than if the seed is sown in the spring.

Laying in Supplies for Winter.

Dust.—It, as I think by far the best way, the floor of the house is used as a dust bath, no special provision for material for the dust bath need be made; but if floors are of wood or cement, and dust has to be supplied specially, a good supply should be stored before the ground freezes.

Litter.—If leaves are to be used for litter, they should be stored as soon as possible. The quicker they are collected and put away after they fall, the tougher they are, and the longer they last on the scratching floor. If allowed to lie exposed to the weather for some time, they become much more brittle, and are quickly pulverized by the fowls.

Farmers who have their own straw, of course have it stacked, and do not need to specially consider the supply for the hens.

Those who cannot get leaves, and have to buy other scratching material, are likely to find this the most favorable time to get their supply, and the poultryman who has provided a place for the storage of such supply, finds now what a convenience it is.

While I consider leaves the most satisfactory scratching material for those who can get a good supply with little trouble and expense, they are practically available only for those who can get them nearby. Those who buy stuff for scratching litter will find oat straw and corn stalks the most satisfactory — the straw to be used without cutting, the stalks to be cut into about six inch lengths. Most kinds of hay make less satisfactory litter; fine hay packs too close, while coarse long hay is tough, and mats and tangles.

Green Foods and Roots.—Cabbage is the best of winter green foods, and the most convenient to feed. A poultryman who does not grow his own cabbage should lay in a supply before winter, otherwise he is likely to have to pay too much for what he uses. Failing a supply of cabbage, good clover or alfalfa makes a substitute that insures the fowls will not suffer for lack of green food.

Of root crops, beets are the best for poultry, and large mangel or sugar beets the most satisfactory. These are seldom grown for sale in the localities where they would be most in demand for poultry, and unless the poultryman grows them himself his supply is likely to be uncertain.

Exhibition Fowls.

For most exhibitors the show season is still several months away, yet it is not too early to begin to prepare birds for show if one intends to show. Indeed, if there is even a remote possibility that one may want to show, or if he thinks it at all possible that there is in his stock a bird anyone else would buy to show, he should begin now to consider the matter, to provide against anything occurring to spoil an otherwise useful exhibition specimen, and by every means in his power to put such birds in good condition and keep them so.

The almost universal fault of novices in exhibiting fowls is to put off the preparation of the specimen to be exhibited until the show at which it is to be exhibited is close at hand. Then they find all sorts of things wrong. Birds so short in weight that it is hopeless to think of getting them up to weight; birds with scaly legs, with broken feathers, etc., and in many cases the owner has little idea how to remedy the trouble, and loses still more time in finding out.

Now many of the most common faults discovered by the novice when trying to select birds to show are faults that in a specimen of any value should be remedied whether the specimen is to be exhibited or not. Scaly legs should not be tolerated in a yard, nor should such lack of condition as exists when a fowl with a frame that should easily carry the weight required by the Standard is a pound or two short of that weight.

By taking the possible exhibition birds in hand now, they may as a rule be quite easily fitted and well fitted. With two or three months to make weight they will come on fast enough on ordinary good feeding; scaly legs may be cleaned up gradually and be in fine condition long before the show; broken or clipped feathers may be removed, and new ones have ample time to grow in their place. Besides this, special precautions may now be begun to avoid accidents to specimens that may be wanted to show. This is most necessary with the young males. They must not only be kept from injury by fighting, but a good specimen must not be kept where he will be bossed and cowed by another male even if the other is so much the boss that no special damage is done to comb or plumage. A male to show to advantage must show spirit, and though most of them have spirit enough when given a chance to develop and display it, a male that has been knocked about for months takes more than a few days or weeks to come out and show all that is in him.

There is still another reason why attention should be given to the selection and fitting of possible show specimens. It leads the poultryman to study his stock much closer than he is likely to do if he gives no attention to exhibition quality and condition, and though he should not show a single specimen, all the time and thought he has given to this work will be found when he comes to mate his fowls for the next season, to have been well spent. The matter of fitting birds for exhibition will be treated more at length in the next lesson.

The Poultryman Who Begins in the Fall.

I am often asked what time of the year is best to begin poultry keeping. Judging by results of first efforts I cannot say that it makes a great deal of difference, but the fall has always seemed to me the best time to begin, because beginning at this season experiences come in their logical order, and something of the handling of adult stock is learned before hatching and rearing questions press for consideration.

The poultryman beginning now, if on an old plant, has to take much the same steps in getting houses ready for winter as have already been mentioned. One building new houses, of course has no cleaning up or repairing to do, but unless buildings are already well advanced they must be pushed rapidly to have them ready for the stock before winter sets in.

It is best not to buy stock until the buildings are practically ready, for fowls coming to a new place will not stand confinement in makeshift quarters as well as fowls reared on the premises do, being continued longer than advisable in the summer quarters. In fact the stock in summer quarters may come along as fast at present as if in winter quarters, but the point is to avoid moving them just as they are about to begin laying, and to guard against too much exposure, when, as is often the case, the coops are unsuitable for cold, stormy weather.

With fowls brought to a new place, sickness may easily develop if conditions are specially unfavorable. Hence it is better to have the house all ready before a fowl is put into it, and not to get fowls until the house is ready for them. A great many do buy fowls and keep them confined in small coops perhaps for a month, while making the house ready. This gives the fowls a very poor start for the winter.



LESSON XVIII.

Exhibiting Fowls.

Practical Value of Exhibiting to the Exhibitor.

TOO many poultry keepers who keep poultry primarily for profit, or for poultry and eggs for the home table, regard the exhibiting of fowls and the breeding of fowls for "fancy" points, as of no particular interest to "practical" people, and of no actual value to them.

This is an error. Without conceding to "the fancy" that preeminence in the development of poultry interests which fanciers like to claim for it, everyone well informed in poultry matters must allow it credit for a great deal of the progress made and still making, and must also admit that a thorough knowledge, or even a fair knowledge of the characteristics of fowls and the principles of breeding for uniform results is rarely acquired by a poultryman who takes no interest in exhibition points and exhibits of many fowls. There are, of course, a great many so-called fanciers who know little of breeding, but the poultryman who takes no interest in "fancy" points, and does not breed at all for appearance—for beauty, either according to the general standards or according to some fixed ideas of his own, and still produces good fowls, is such a rarity that I have yet to meet the first one. Practical poultrymen who disregard "fancy" points, as a rule, breed absolutely without intelligent selection. A very large proportion of their stock is decidedly inferior, even when nominally their stock is thoroughbred, and I have repeatedly seen in the yards of such breeders very poor birds, both male and female, in the breeding pens, and good ones not used for breeding, or good males mated with inferior females, and *vice versa*, with the result that only a very few good specimens were produced when there was good stock enough in the yards, if properly handled, to have given the poultryman two or three times as many good young birds as he got by his way of mismatching, and many of them very much superior to any that he did produce.

Now through books and papers a poultry keeper who is sufficiently interested in a variety of fowls to "read up" on it, may learn a great deal without ever attending a show or making an exhibit; but he is sure to get a great many ideas that are wrong, to entirely overlook many points of importance, and fail much oftener than is necessary in assigning to various excellencies and faults their proper values.

Without exhibiting, a poultry keeper who will attend the shows and mingle with the fanciers there, will learn a great deal that self-taught he misses, and will learn more easily and quickly many of the things he would learn by himself; but it is the universal testimony of those who have gone through these several degrees of instruction in breeding and selecting for points that a personal experience in exhibiting when the exhibitor attends the show and gets the benefit of it is the best way to learn—so much better than any other way that there is no comparison.

In such experiences the results of errors in judgment in breeding, selection, and preparation of fowls for exhibition become conspicuous while the corresponding correct condition or method may be clearly illustrated by a more successful competitor. Then there is no place like the exhibition room for a breeder to learn to estimate the types and characteristics which

please him in his fowls at home at their true value, and without disregarding his individual tastes and preferences to learn to modify them to harmonize better with popular ideas. If one wishes to sell fine stock, or to gain a reputation for producing and having good stock he must keep his ideals somewhere near those of the rest of mankind interested in that kind of stock.

Exhibitions of poultry are now so numerous and so well distributed that there are comparatively few poultry keepers too far from any show to make an exhibit and look after it in person at least during a part of the time, and I would urge every reader of this lesson who keeps thoroughbred fowls to make it a point to exhibit at the most accessible show. If one begins early to make preparations to exhibit, and gets his birds in good physical condition they will have to be very poor indeed to discredit him. Where most novices "fall down" is in putting off selection and preparation of specimens to be exhibited until within a few days of the show. Then the birds go into the show in poor condition, and attract attention more by poor condition than by lack of merit.

I have at such length urged readers to exhibit not merely for reasons already given, but because so many breeders of thoroughbred fowls attach undue importance to the matter of winning at a show, and feel that it is a disgrace to lose and therefore poor policy to show unless one has a reasonable expectation of winning. Then assuming that there will certainly be many good birds in their class, shown in good condition, they conclude the wiser course for them is to keep their birds at home. There is pleasure and generally credit in winning, but wherever competition is strong many must lose, and there is no disgrace in losing with a good exhibit to a rival with a better one. And in the show room merit gets the recognition of visiting fanciers, whether decorated with prizes or among the unplaced. I might say much more to urge reluctant breeders to show, but I hope that what has been said will prove enough, and in passing to the matters properly in this lesson will only say further that the reader following these lessons who neglects to learn what he can in that way will get much less out of some of the more advanced lessons in the course than those who do.

Something About the Poultry Shows.

American poultry shows may be roughly divided into two general classes:—

The poultry exhibit held in connection with an agricultural fair.

The poultry show, proper, held by an association organized solely or primarily for that purpose.

Though there is a rapidly increasing number of exceptions it is still true in a general way that the exhibits at fairs, where they usually occupy a subordinate position, bring out a decidedly inferior class of fowls, are often judged by incompetent persons, and do not begin to afford the opportunities for instruction and comparison of ideas that are found in even the smallest of the special poultry shows.

For this reason readers who wish to exhibit for the sake of what they may learn by exhibiting are advised to exhibit at a winter show unless the poultry exhibit at the fair accessible to them is conducted in about the same way as a winter show, and is well patronized by fanciers in the territory from which it draws exhibits. A number of the more important fairs now run their poultry departments on such a basis, and some of them are as good or better than the winter shows in their vicinity. Occasionally there is enough local interest in the poultry exhibit at a small fair to secure suitable classification, the employment of a competent judge, and consideration of standard requirements in the placing of awards. At such a fair it is worth while to exhibit. But the general run of agricultural fairs, with primitive classification, lack of orderly arrangement, poor care of exhibits, and judgment according to no known standards and by men of no qualifications for the work, do not afford the opportunities for acquiring knowledge which I have in mind; and while I would not dissuade anyone from exhibiting at such a fair to help the exhibit, I would not want a reader to limit himself to such experience in exhibiting and think he had followed my advice.

Fowls Are Judged by the "Standard."

At all well managed shows in the United States and Canada, fowls are judged by the "American Standard of Perfection." This book is a collection of descriptions of varieties of fowls made to conform to a general model, compiled by the American Poultry Association, and is by

custom and general consent the common " law " as to requirements for the varieties included. A copy of this book it is essential that every exhibitor and every breeder of thoroughbred fowls should have. Trying to breed and exhibit without the information in this book is like trying to do any kind of work requiring accuracy without a model, pattern or plan. Probably four-fifths of the mistakes of new exhibitors are directly due to their failure to inform themselves about Standard requirements.

True the Standard contains errors, and errors are sometimes made in applying it. For these an exhibitor is not responsible. The exhibitor is responsible for his own failures to conform to the Standard requirements that are plain and unmistakable, and he can only be sure that he makes no errors here by consulting the Standard on every point which may concern his exhibit.

Applying the Standard in Selection of Specimens to Exhibit.

To a novice who has never seen the application of the Standard demonstrated in judging, and had the opportunity to have the demonstrations which specially interested him further explained by the judge or other breeders, many of the descriptions in the Standard are vague and indefinite, but with these descriptions he need not concern himself at this stage. Leaving them for the present he should give his attention to the points that are clearly and unmistakably plain, for these are, as a rule, the points upon which judges most nearly agree in the application of the Standard, and under any competent judge a specimen is almost certain to suffer if "off" in any of these points. In regard to them, knowing what the Standard says, even the novice may know what the judge will do about them.

The best way to study the Standard description of a variety of fowls is to have one or more males and females of the variety under consideration cooped where they can be handled at will, and examine each section in the birds as the description of it is read in the book. The better the specimen the easier it is to understand the description. It is advisable for the prospective exhibitor to give himself several drills of this kind to familiarize himself with the Standard requirements before he undertakes to select specimens to exhibit.

The descriptions state in a concise way, and almost without explanation, what is required in an ideal specimen.

Having selected one or more specimens which seem to be his best according to the description, the novice should next look up the disqualifications and examine carefully for them, for a bird that is plainly disqualified, though in every other way a fine specimen, and the disqualifying feature a very trivial one, is not only not given a prize, but in score card shows most judges quit scoring as soon as they find a disqualification, and the exhibitor is thus left without the record of the judge's complete estimate of the quality of the specimen, a distinct disappointment and misfortune when he shows to learn.

On page 28 of "The Standard of Perfection" is given the list of general disqualifications — that is, of disqualifications which are the same for all or many breeds. Preceding the description of each variety the additional special disqualifications for that variety are given.

To illustrate the method of looking for disqualifications.* Suppose a Barred Plymouth Rock is under examination. Turning to the list of general disqualifications, the reader sees at once that the first three do not apply to Barred Plymouth Rocks. Coming to the fourth he finds it reads thus:—

"In all breeds required to have unfeathered shanks, any feather or feathers on shanks, feet, or toes, or unmistakable indications of feathers having been plucked from the same."

Now the novice whose idea of a feathered leg is of a leg profusely covered with feathers is apt to let that pass without a thought; but he needs to give the point attention, and the legs and feet of the fowl a very careful examination, for tiny feathers are often found on the out-

*The reader must not understand that what follows is the method pursued by a judge, or an experienced exhibitor, or the method he will himself pursue when familiar with the Standard and with his breed. The expert knowing the disqualifications without reference to the book, and having them all in mind, sees the more conspicuous ones at a glance. The breeder will look next for those most common in his stock. The judge using the score card generally begins with the first section, and going right through the list, takes note of a disqualification when he reaches the section it is in.

side of the shank of a fowl of a clean legged breed, and frequently they are so small that it takes a very careful examination to discover them. Sometimes there is only a stub of a quill, but that is as fatal as more.

While examining for feathers he should also look for down between the toes of the fowl. By "down" is meant, as he will see by referring to the glossary of technical terms, a feather so minute that the quill is not visible to the naked eye. Formerly down disqualified the same as feathers, but now it is cut as a defect.

The next general disqualification in regard to clipped wings also applies to Plymouth Rocks. If any of the specimens under consideration have had their wings clipped there is ample time now to pull out the clipped feathers and let new ones grow in their place. Even if not full grown at the time of the show the new feathers show the quality of the wing. The reason for disqualifying for clipped wings is that if they are allowed to pass with a cut it is possible in some varieties by clipping a wing to remove a disqualification.

The next general disqualification which might apply is lopped comb. The glossary defines a lopped comb. Such combs are rarely found now on Plymouth Rocks.

Next, "decidedly wry tails," that is, the tail carried to one side. This is quite a common defect, and is often unsuspected. A badly wry tailed bird it is no use to exhibit, but one that is only slightly wry, or only occasionally carried wry, an exhibitor will take chances with, for it is the practice of judges examining such a bird to try to get it to carry the tail straight, and if it will do so for only an instant the tail will pass.

Next, "crooked backs." This is another fault often unsuspected by even exhibitors of some experience, but easily found by the judge who passes his hand over the back of the fowl.

Next, "side sprig or sprigs on the comb of single comb varieties." This is a very common defect.

Next, "decidedly squirrel tail," that is, the tail carried so high as to suggest the habit of the squirrel which carries its tail curving to the back. In short tailed breeds like Plymouth Rocks this defect is rarely conspicuous.

Next, "blind in both eyes." A very rare defect.

Next, "in four toed breeds, more or less than four toes on either foot." Not a very common defect.

Next, "entire absence of main tail feathers." The feathers will not be absent unless they have been removed. They do sometimes get removed accidentally. The disqualification is to cover the case of the exhibitor who would remove them to hide a fault or disqualification.

This completes the list of general disqualifications for faults which apply in this case. Turning to Barred Plymouth Rocks, we find the following special disqualifications:—

"Positive white in ear lobes; red in any part of the plumage; two or more solid black primaries, secondaries, or main tail feathers; shanks other than yellow with due allowance for fading with age, dark spots not to disqualify."

The search for these disqualifications leads to an examination of the ear lobes for white, of the entire plumage for feathers with reddish spots on them, of the stiff feathers of wings and tail, and of the color of shanks and toes.

In looking for these disqualifications the exhibitor will have given his birds a pretty careful examination, but he is not through yet. On pages 29 and 30 of "The Standard," is a list of cuts for the more common defects, by reference to which he will learn the common faults and find some for which a specimen may be punished so severely that as far as chances of winning are concerned it might as well be disqualified.

We will not go through these here in detail, but refer only to the more important ones which apply in the case. These refer to irregular barring and to black feathers. Irregular barring is very common, and there are very few Barred Rocks which have not some black or partly black feathers in the plumage, which an inexperienced observer might not notice at all, but which the judge as a rule quickly discovers. It is the common practice of exhibitors to remove these feathers before showing the fowls. I will not attempt here to go into the ethics of the practice, but pass the matter with the remark that it is quite useless for one who leaves them to show in competition, and that as the Standard is worded now their removal is not "faking."

For any other variety the prospective exhibitor should proceed in the same way, letting no

section connected with a disqualification pass without a careful examination, and paying special attention to the common defects mentioned for the variety he is considering. It takes time, and it is work; but it is work that must be done if one would compete successfully in the exhibition room, and is quite as necessary, if though never exhibiting he wishes to breed to Standard requirements. Without this careful examination, and the thorough knowledge it gives both of the variety and of the individuals handled, a breeder will soon find his stock more distinguished for its faults than for its excellencies.

Fitting Fowls for Exhibition.

Having selected such specimens suitable for exhibition as are required, the next thing in order is to make or keep them fit for exhibition. Occasionally a specimen can be taken from the yard and sent to a show without any preliminary fitting or handling, but most birds need something done for them.

Broken feathers should be removed that they may grow out again. Scaly legs should be cleaned up. Specimens short in weight or out of condition should have special care and feeding. For each variety, according to its necessities, provision must be made to get and keep the specimens in perfect condition. Fowls with feathered legs must not be allowed to scratch and break the feathers on the feet. White fowls especially must be kept clean. Males must be kept where they cannot injure their combs, and the keeper must see that they roost where they will not break the tail feathers. Often roosts too close to the wall completely ruin the feathers in the tails of the male birds.

For all this general preliminary fitting fowls should be kept in their usual quarters, these, if necessary, being arranged to insure, as far as possible, freedom from liability to accidents that might spoil their condition.

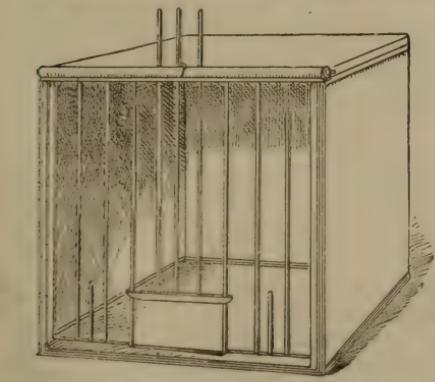
As the time when they are to be exhibited approaches, the fowls should be confined to the exhibition coops for a part of the time at least, that they may become accustomed to the coop, and should be handled frequently. The handling should be gentle and careful. If possible a novice fitting his fowls for exhibition should seek the personal advice of some more experienced exhibitor at every stage, and in no one point is it more important to be "shown" than in catching and handling the fowls.

Many a novice finds that his way of handling fowls results in the case of wild, shy, and nervous fowls in many feathers being pulled out or broken, and with such experiences the birds do not rapidly become docile and easily handled.

Unless the fowls are tame enough to be picked up readily almost anywhere they should be

first caught from the roosts at night and put into small coops, preferably exhibition coops, something like that shown in the accompanying illustration.

To catch and handle them from such a coop have the coop at such height that the bird in it is easily reached. Then to catch the bird reach in with the left hand and take it, with its head toward you, by the legs at the hock joints, your arm passing under the bird so that as it is withdrawn from the coop its weight rests on your forearm, and the palm of your hand being upward. Don't catch by the thighs, or the bird may struggle, and in its struggles pull out feathers. If you take hold right with the hock joints in the hand, while the fingers grasp the shanks, the bird feels itself securely held, and is likely to submit at once, while such struggles as it may make cannot damage the plumage.



A Combined Exhibition and Shipping Coop.

Dimensions—height 30 in.; width 30 in.; depth 24 in. Dimensions—height 30 in.; width 30 in.; depth 24 in.

If unable to get the bird in that way, catch it with the right hand by the wing close up to the body, and drawing it toward you get the hold first described. Never attempt to hold the bird unless you have a secure hold that will not hurt it.

Most birds respond quickly to firm and kind handling, and learn to like it, but occasionally one is found that is very intractable. Unless such a specimen is of remarkable quality it is not worth while to fit or show it.

If the birds have been given special care for some months to bring them naturally into show conditions, the work at this stage will not go much beyond training to make them gentle, to have them "coop broke," as it is called. But in the case of white fowls it is desirable that they should be washed, and if birds are to show to advantage with well washed birds they also must be well washed. The novice who leaves washing until just before the show is very likely to make a mess of it. The better way is to begin to practice, not necessarily on the birds to be exhibited, (any white fowl will do), long before the show, and be familiar with and somewhat skillful in the process before you try it in the final preparation of an exhibition specimen. Take a bright warm day in the fall, when the bird can be dried in the sun, for the first attempt, and when the general warm atmosphere makes it less likely that the washed bird will catch cold in being thoroughly dried off.



Suggestions From Experts.

Supplementing these general instructions, I quote from three of the best articles on preparing fowls for exhibition that have been published in this paper.

Mr. A. C. Smith, in an article on preparing birds for exhibition, says:—

"As it is impossible in this climate to allow birds to run in the fields during those months when shows are mostly held, we must imitate those conditions, and supply what nature furnishes when they are at range in some model pasture. While many poultrymen supply some of these things, there are few who realize the importance of fresh air and exercise. These are prime essentials to good health, and they are about all that is required to make a good coat, except wholesome food. To neglect giving the birds plenty of exercise, or even forcing them to exercise if necessary, is to abandon our greatest help in conditioning fowls. Fresh air is a subject that has been discussed but little if at all by the poultry press in connection with the condition of exhibition fowls. The necessity of a good supply of this abundant and inexpensive article is most emphatically urged upon all poultry keepers. It will affect the coat both as to hardness of feather and lustre. The reader has but to experiment for a few days with a well ventilated hen house and a poorly ventilated one to see the effect upon the fowls. Keep the windows closed, or nearly closed, both day and night, and watch your birds as to hardness of feather, lustre, and color of head parts, and then try a little judicious ventilation, and note the difference in the tone and appearance of your birds. Such an experiment may be confined to your own house instead of being carried to the poultry house. Close your sleeping room up tight all night, and your own feelings in the morning will demonstrate the necessity of a supply of pure air for the fowls at all times.

"Green food is another essential which birds crave, and it should be supplied in good quantity. This leads us to the subject of feeding fowls that are being prepared for exhibition. All foods should be sweet and wholesome. Fowls are not swine, and will not thrive upon the care usually accorded that much abused race of animals. Good judgment must be used as to the amount of food. Too much food means too much flesh, and fowls too lazy to take the needed amount of exercise.

"To get the required amount of exercise in confined quarters, a litter of leaves, coarse hay, or rye straw should be placed upon the ground to the depth of four or five inches. A few oats should be scattered in this as soon as the birds are fairly off the roost in the morning, if it is during the short days of winter. Then as soon as the mash can be prepared the birds should receive about two heaping teaspoonfuls each. This small quantity warms them up and sets the machinery of their digestive organs to work, but is not enough to destroy their appetite for more. This mash should be made of ground oats and corn meal, or corn meal, flour middlings, and bran, or acme feed. The proportions should be governed by the quality of the goods. A mash that is so light in substance that it does not cling together is not rich enough; neither is a tough, dough mass what is desired. This mash should be seasoned lightly with salt, but no

spices whatever should be used, as they tend to intensify the color of the head parts for a time only, and to diminish it in proportion thereafter. It is also advisable to use a small quantity of bone meal in this mash every morning, and twice a week a little refined fish meal, say one-twelfth or so. This is a forcing food, and but little should be employed unless it is desired to bring females toward a laying state. Clover meal should be used once or twice a week in this morning mash. It is preferable to cut clover, as the latter is too bulky in the crop, and often clogs the passage to the digestive organs. The fowls should be kept scratching until noon, when the green food should be fed. Everyone has his preference; the writer prefers cabbages, as they are the greenest and tenderest thing to be procured in the winter months. Green food can be placed before them in two ways — it may be chopped, and a certain amount fed every day, or it may be placed before the fowls in an unlimited supply. If it is furnished without restriction, it must be kept constantly before the fowls, otherwise they are liable to eat too much when a new allowance is supplied. Between three and four o'clock the fowls should be given the heartiest meal of the day. It should consist of either wheat or barley, and should be well covered with litter. The exact time that it should be given depends upon the length of the day. The object is to give the fowls an hour or an hour and a half of exercise before they go to roost. Considerable can be accomplished by a selection of grains. If the birds are too fleshy, more barley and less wheat should be used for the evening feed. If the weather is very cold, and the birds in a normal state of flesh, a small handful of corn may be allowed each one just before it jumps upon the perch for the night. With fowls that are poor in flesh it is well to use more wheat and but little oats and barley for a scratching feed. Corn should be fed for the evening feed to birds in this condition.

"Young birds of the heavier breeds which are somewhat under weight should not be forced to over-exercise, (in such cases, increase of weight is the main point); but a moderate amount of exercise will prove advantageous in these cases, also. A great variety of food should be sought for such birds. The mash should have a greater proportion of corn meal, and a mixture of wheat and barley with a small proportion of oats should be used during the day to make the birds exercise. Broken sweet crackers of all sorts may be used in connection with corn meal and bran as a soft food to good advantage. In cold weather sunflower seeds and buckwheat in small amounts are good agents in securing the desired object. The last two are also very instrumental in procuring that lustre so desired by the best exhibitors. Beef tallow is very good to give a lustre to the coat. Too much is not beneficial to the general health of the bird, but a piece one-half the size of an English walnut every second day will answer the purpose and prove a great treat to the birds.

"The quarters for the birds during this preparation should be all that quarters for any fowls should be — dry, sunny, well ventilated, but free from drafts. It would be well to clean them a little oftener than usual. No chance should present itself for the birds to soil their plumage, as the natural has more life than the washed plumage. To that end the droppings should be removed a little oftener than usual, and no soft or green foods left where the plumage of the birds can come in contact with them.

"It is hardly necessary to say that these birds must be kept absolutely free from lice, and in particular cases like these nothing in my opinion answers as well as a thorough dusting once a week with lice powder.

"The males and females should for obvious reasons be conditioned in separate compartments, if not in separate houses. The males usually do better with one to three females, of course only those which are of no consequence for exhibition purposes. The females may be conditioned together to the number of six or eight, but when more than that number are placed in the same pen all do not seem to thrive.

"Grooming is sometimes resorted to in order to give the bird a sleek appearance; one which has had plenty of fresh air and exercise seldom requires much, however. The best implements for such work are the hands or an old silk handkerchief. The feathers should be rubbed very lightly as they show the effects of the least wear very quickly.

"The mention of any tonics, washes, drugs, and what may be termed 'brilliantines,' has been carefully avoided, as the course here described will do all that those things will do, and all that is necessary in forty-nine cases out of fifty. Nothing is absolutely required except the every

day stock of the cook room, and a quick eye for the condition of the birds and the houses, to enable you to set up as finely conditioned a string of birds as any of your contemporaries."

How to Wash a Fowl.

Mr. E. Wyatt, in an article on preparing fowls for exhibition, gives the following detailed instructions for washing fowls:

"All white birds need to be washed before being sent to the show, and this should be done two or three days before sent on their journey. To wash a bird is a difficult thing, and may rightly be called an art. If it cannot be done right, it had better not be done at all, for the birds will look ten times better by not being touched than if they were washed and a bad job made of them. Those breeding white birds have often noticed when passing through a show, many white birds looking smoky in color, the feathers sticky, not sitting right; in fact, looking very unnatural indeed. The matter was that they had been washed, and that by an inexperienced hand, whose birds would have looked better if they had never been washed at all. And so it goes, if it cannot be done right it had better be left alone.

"The first thing necessary is to prepare a kitchen for the work, and start a good brisk fire in a wood stove. Remove all the unnecessary furniture; warm plenty of clean rain water, and set three good sized tubs in position around and close to the stove. One needs a good assistant, and no better can be found than a good patient woman. One must have an assistant, for many things will need tending to that can't be done by one person. First, have all the birds ready, so that no inconvenience will be caused by having to go to the hen houses for the specimens just when they are wanted. After having removed all the dirt on the feet, if there be any, a good fanning is necessary so as to get all the dust out of the feathers that is possible to do so before applying the water.

"Tub No. 1 should be filled half full of water, lukewarm, as near blood heat as possible, or a little warmer will not hurt. Put the bird gently into the water, holding it there either by the feet or by the sides of the body, depending on its disposition. If the bird has never been washed before, it will not know what to make of it at first. It may want to fly, or many other things.

"Just then, the operator will have to exercise that highest of all virtues—patience. Take it easy for awhile; hold the bird down in the water, partly immersed, and in a while begin applying water with a good sized sponge. With this rub the feathers with the web as they lay; never rub against the lay of the feathers. The best way to hold a bird in the water is, when seated on a chair close to the tub, to face the birds towards you, and wash away from you. You will find it a very difficult job to get the feathers *wet*. After applying water with the sponge for a while, then begin using the soap. Castile or Ivory soap is good, but I always use Colgate's shaving soap on my White Cochins, and White Cochins are the hardest breed of all to wash on account of the great length and fluffiness of their feathers. With free use of water and soap get the feathers all over—neck, breast, back, cushion, wing, tail, thighs—as wet and soapy as you can. Use the sponge freely, and wet and wash the feathers right to the skin until you get all that dry and fluffy appearance out of them. Then they are properly wet.

"Continue rubbing with the sponge, and applying the soap, turning the feathers over and over, and getting at the entire surface of every feather if you can. By so doing, you will get all the dirt out of the feathers, and the next step is to get out the soap.

"Tub No. 2 should be in waiting, half full of clean lukewarm water, as before. Here the bird is put, as in tub No. 1, and washed thoroughly, so as to get out all the soap. After rubbing with sponge, and using clean water freely, take a dipper and keep pouring the water out of the tub over the bird, letting it fall with a little force from about a foot above the bird. This will part the feathers and cleanse them from the soap. Do this all over the bird. If you do it right, one tub of this kind of work will be enough.

"Tub No. 3 should also be handy, and in it some cold water with just as much bluing as the good wife uses for bluing the white clothes. Into this the bird is put as before, and rinsed with the cold bluing water. The water should be just cold enough to be chilly. The reason for this cold shower bath is for the same purpose that men take them after taking a

plunge in a warm bath—it prevents catching cold. After going through these three operations the bird is ready for drying, which is not by any means the least important part of the work.

" After taking the bird from tub No. 3, put the bird on a board placed on top of the tub, and by means of the hands squeeze all the water out of its feathers you possibly can. Remove the bird then to the top of a box, or a chair, placed very close to a good brisk fire, and begin toweling it with warm dry towels, so as to absorb all the moisture out of the feathers that you can.

" Now the bird is ready for drying. Keep it before a brisk wood fire, but not so near as to curl the feathers, or you will spoil them so that they cannot be remedied. With a strong palm fan let the assistant begin the drying, first fanning one side and then the other. This part of the work is gone on with until the bird is thoroughly dried. The fire needs to be brisk, the bird kept turned around, and the fan going all the time, and it is surprising how soon the feathers will dry and open up so nice and fluffy. The fluff, the back, and under the wings will be longest in drying. Holding a wing up with one hand, and fanning with the other, will soon make wonderful changes. If the work has been successful thus far, little difficulty will be experienced in getting the birds dry and putting on the finishing touches.

" And now we will suppose the bird is nice and dry, and that the feathers are free from soap. It is a difficult job to get the feathers wet and soapy, and a difficult one to get the soap out again. All it requires to accomplish both is time and patience, and good clean warm water. But if, on drying, it has been found that the feathers are sticky and do not open nicely, which will not be the case if the work has been done right in first place, put in order again another fresh lot of clean warm rainwater, and rinse over again as before, and proceed with the bleaching and drying again."

What to Do On the Way, at the Show, and Home Again.

On these three points Mr. Smith, generally reputed one of the best fitters and handlers of exhibition fowls in the country, gave our readers a few years ago the following advice:—

" Mistakes which seriously handicap a bird are often made in the mode of shipping to a show. Most anything will do for a shipping coop, for some people. The most common mistake is shipping male birds in coops that are not high enough, as the bird will take a stretch now and then, and if he runs across anything new is liable to jump, he will strike his comb against the top of the coop, and when this sort of exercise is practiced for a few minutes that ornamental fixture becomes anything but ornamental. The coops that some leading breeders and exhibitors ship in have solid instead of slat tops, which are sure to injure any but the firmest and smallest of single combs.

" Experience has shown the writer that single comb males of the American class should have a coop 28 to 30 in. high, and not less than 17 x 18 in. on the floor. Males of the rose comb varieties may be shipped in coops 4 to 6 in. lower. For males of the Mediterranean class, nothing short of 22 to 24 in. in height should be used, and for some birds the coops should be even higher. But one bird should be shipped in a coop or compartment, no matter how long they have run together, or how friendly they may seem. The confinement in narrow quarters never improves, and often destroys the good feeling that has heretofore existed between them.

" The larger and more successful exhibitors, as a rule, accompany their birds, or send an attendant to care for them whenever they exhibit. Some of these exhibitors go so far as to say that they will never show a single bird unless accompanied by a competent handler. Those who are acquainted with the many duties and cares of the average show official can readily understand that if our birds are to get extra care we must supply it. The wisdom of accompanying birds or sending an attendant is born of experience.

" Your duties do not cease when your birds leave your yards, and begin again when they arrive at the exhibition hall. It is most necessary to have a watchful eye upon the coops and birds when in transit. Expressmen are much more likely to keep the coops right side up when under the eye of the owner, or one supposed to be the owner, and the messenger less liable to bury the coop under baggage when you occasionally peep into the express car.

" As soon as the birds arrive at the show room they should be moved to some comfortable place, and the show cages made ready for their reception, if this has not already been done.

The cautious exhibitor will wash all drinking and feeding cups in as hot water as he can procure. This is quite necessary to prevent roup, canker, and other contagious diseases, unless you furnish your own cups, a thing it is not always convenient to do. Plenty of sawdust should be placed in the bottom, as no chicken or fowl will stand in form upon a substance too hard to catch the nails. Then if your birds are white the cage should be rubbed free from dust and dirt. It is better to fill the drinking and feeding dishes before the birds are placed in the cages, as they are much disturbed by the change, and it is well not to trouble them any more than necessary until they become accustomed to the surroundings.

"It is to be supposed that the birds have been in preparation for the show for some time, that they are free from vermin; that the plumage is clean, as well as head, legs, etc. If the legs and feet have not been cleaned, they may be now by applying castile soapsuds with a nail or tooth brush. These suds should be rinsed off, and the legs rubbed dry with a soft rag. To bring the color of the legs out, a small quantity of cotton seed oil should be thoroughly rubbed in. The rubbing should be thorough, as the oil will hold all the dust and dirt that strikes it. The dirt that often collects under the scale may be easily removed after the washing by using a common wooden toothpick.

"Lotions are often applied to the face, comb, and wattles, to intensify the color. If the bird is in the pink of condition it will scarcely be necessary to more than wash these parts with a sponge dampened with tepid water. The effect of most of the washes used to brighten the head parts depends upon the quantity of alcohol contained. Many use alcohol diluted with water; vinegar is often used. The effect of this liquor is due to the acetic acid, which is part of its composition. Acids and alcohols brighten the color only for a short time — a few hours at the most. After the action the reaction sets in, and these parts become paler instead of brighter. These agents have but the effect of making the bird appear in perfect condition for a very short time. After that they appear to less advantage than if they had been left to do their own coloring. It may be said without fear of contradiction that the application of these sharp acids and hot lotions is not worth the trouble. It is my honest belief that their application has not changed an award or misled an intelligent judge in the last ten years. About the best thing as well as the simplest that can be used for this purpose is a very small quantity of vaseline well rubbed into the place of application. This will intensify the color, especially in a room of a temperature as high as that which human beings usually inhabit.

"The food furnished at the average poultry show is limited to hard grains of one or two kinds. This is not sufficient variety, even for three or four days. It is highly important to supply the bird with grit and oyster shells, as well as an allowance of green foods. It is a good plan to furnish the regular warm morning mash. This will involve but little labor if all its ingredients are mixed dry, put in a bag, and taken with you. It should be the attendant's duty to clean the coops in part twice a day at least, and put in a fresh supply of sawdust occasionally.

"Of all the evils of the show room drafts work the greatest harm. In fighting them, a piece of brown paper, or several folds of a newspaper, will be found very effective. Drafts come from all directions, but those that come through a hole or crack in the bottom of the coop are the most apt to escape notice. These cause many colds. They may be prevented by tacking a piece of pasteboard over the opening.

"In some show halls the temperature is allowed to fall many degrees at night. A change in temperature of twenty to thirty degrees in a few hours does not agree with fowls as a rule. It is advisable in such cases to cover the top and front of the coop at night, after the room becomes somewhat cooler than it has been during the day, always having, of course, some ventilation. Such a proceeding is also advisable when the hall is left lighted during the night, as the birds rest better, and appear fresher if the coops are darkened during the night.

"Getting the fowls home is fully as important as getting them to the show. As they have been so closely confined for several days, they are less vigorous than when taken out of the yards, and consequently more liable to disease. The care should not slacken for one minute until the birds have been well established in their regular quarters for several days, and it becomes certain whether or not they are the worse for their experience."

LESSON XIX.

The Fattening of Poultry.

WHAT is fat? My dictionary describes it, and tells me that it is a part of animal tissue, and is also found in plants. From advocates of "scientific" feeding, more may be learned about it. They discuss it as a food element and as a body constituent, and though we may not follow them through all their ideas, let us give them credit for having made the people of their generation more familiar with the qualities of food and the requirements of the animal organism.

Fat in the organism is an extremely concentrated reserve supply of nourishment stored for emergencies, and sometimes, also, by its disposition under the skin, made to serve as a protection from cold. Indeed, when stored in large quantities the bulk of it is usually deposited next the skin, though a good deal is distributed through the muscular tissues, and sometimes large quantities accumulate about the internal organs. Nature's problem in the disposition of the fat on a person, animal, or fowl is very like that of a man who has to find place for a store of materials in a workshop in which practically all the available room is required for the work carried on and materials actually being used. But a small quantity of fat can be stored in the body without detriment to it, or interference with its functions. Wherever placed, it is a dead weight to be carried — more or less of a burden. An excessive accumulation of fat between the muscular tissues and about the joints and the juncture of sinews with the bones impedes the action of the limbs. Large deposits of fat about the internal organs seriously interferes with their functions. Again, the sense of fullness occasioned by such a never failing reserve

apt to dull the appetite, and the tendency to inactivity combines with this to weaken the digestive organs and so gradually destroy the vitality and vigor of the organism.

From the point of view of the poultry breeder and egg farmer, fat, in excess of the small reserve necessary to offset irregularities in feeding, production, and temperature, is a bad thing.

From the point of view of the poultryman about to sell, and of buyers of table poultry, fat—and a great deal of it — is desirable.

The fowl in good breeding or laying condition is not, as a rule, in good table condition. The chicken, as it runs on the farm or in the yard, lacks the plumpness and smoothness of a fatted chicken. The lean fowl or chicken, though tender in flesh, is dry meated and not especially appetizing. When hard meated it is quite undesirable. So for table purposes poultry should be somewhat fat. How fat, is a question for individual tastes, or market demands, to determine.

In some foreign countries, notably in France and Belgium, there is some market demand for excessively fat fowls, and the process of fattening fowls for this demand is something of an art, requiring considerable skill, good judgment, and first of all, fowls constitutionally well adapted to it. In England, the taste for fat poultry is less pronounced, and a less degree of fattening suffices, but still a good deal of attention is given the art of fattening. In this country very fat fowls are not wanted to any marked extent. In this respect we are behind or not, accord-

ing to the point of view. What our markets require for first class poultry is poultry fat enough to cook well in its own fat, but not so fat that much of the fat still remains after the cooking. Comparatively few people here have any taste for an overfat fowl. To most people poultry fat, except in small quantities, is nauseating, and, of course, the internal fat removed when the fowl is drawn is of no special advantage to the consumer. What the consumer wants is a suitable amount of fat, properly distributed next the skin and through the tissues, so that in cooking, its oil penetrates to every part of the meat, but yet the fat is not anywhere in such quantities that it remains after the cooking, and gives its taste to the meat. To accomplish this, a fowl, especially for a roasting fowl, must be quite fat—much fatter than our average good poultry. Hence we may say that there is little danger of making young poultry overfat by any ordinary means unless the process of fattening is protracted far beyond what is necessary. With old fowls it is different; many of those seen in our markets are excessively fat, and the fat not at all well distributed, but the greater part of it waste—fat which adds to the weight of the fowl without increasing the quantity of edible meat, or improving its quality.

From what has been said I think it will be clear that fat in market poultry is valuable chiefly as an accessory quality. The fat itself, except as it occurs in small quantities in the muscular tissues, is eaten by comparatively few people, but people want their poultry quite fat because the lean meat of the fat fowl is, other things being equal, superior to the lean meat of a lean fowl. There is another reason for this besides the effect of fat in the cooking, which has already been referred to. The lean fowl is lean because of insufficient nourishment, or because its activity hardens the muscles and prevents the accumulation of fat. After maturity the fat fowl may begin to fatten because of a constitutional tendency that way, even on a very moderate amount of nourishment, (though while growing, few will fatten unless conditions are especially favorable), but the subsequent accumulation of fat depends on whether the natural tendency to fatten is aided or discouraged by the poultry keeper.

The stock that is to be kept for laying and breeding purposes should be allowed to accumulate but little fat. Stock that is to be marketed the grower generally wants to have ready for sale at the most convenient or most favorable time. If he has stock all of the same breeding, and well bred, he is likely to find it much the same all through. If a part of the chickens quit growing early and begin to fatten, it is likely that most of the stock will do so. Generally such stock is best fattened and disposed of at once, though sometimes it pays to hold it for a special market and high prices, for, as a rule, stock that begins to fatten young under ordinary conditions and diet does not grow much more frame or muscle. It is the fowls that grow the frames first, then round them out with muscle, and then begin to lay on fat that make the largest and finest poultry at maturity. Such stock a grower often wants to fatten a little in advance of its natural tendency, and to accomplish this he resorts to various artificial means, some very simple, others more difficult.

Beginners generally, and a surprisingly large number of poultry keepers of some experience overrate the importance of special food in fattening, and attach too little importance to conditions and inherited tendencies. The latter question in particular is almost neglected, and in consequence in this country poultry grown especially for the table is too apt to come from stock which is considered suitable for producing market poultry only because it is plainly not suitable for anything else. As a result of the general use of many birds not at all satisfactory from a market poultry standpoint, far too large a proportion of our poultry can never be fattened properly, no matter what foods are used, and not a little of it cannot be fattened profitably, the process requiring too long a time, too much food, and too many individuals falling out by the way because the digestive organs will not stand the heavy feeding and close confinement necessary to make them lay on fat.

To fatten quickly, easily, and profitably a fowl or chicken must first of all be plump. A chicken that is plump at any age can generally be fattened at any age. A chicken that has a "lanky" period during its growth it is almost impossible to fatten during that period. The best illustration of this is seen in the Asiatics, especially the Light Brahma. Under three months of age they may be fattened quite readily. From three to six or seven months they tend to put everything given them into frame, bone, and muscle, and cannot be fattened, even in close confinement in such a short period as suffices after the frame is developed. Shut

them up close and feed heavily at this period and they grow weedily and often become ill formed. In many other breeds, and especially in those having Asiatic blood in their make up, the same condition obtains with regard to many stocks, and sometimes is conspicuous in a part of a flock, and as notably absent in the remainder.



In fattening poultry, therefore, we have to consider first the chickens, fowls, or other poultry to be fattened, whether they fatten readily or with difficulty.

Next we must consider the season, the time of year and the prevailing conditions. Just as all hens tend to lay in the spring, nature tends to make all fowls lay up a supply of fat in anticipation of cold weather with its sometimes heavy drains on the capacity of the digestive organs to meet all physical requirements. Often fowls which could not be fattened at any other time will fatten then.

But, as those who will closely follow current comments on market conditions will discover within a very short cycle of years, the weather in fall has much to do with the fattening of the poultry crop of the country. If the general mean temperature is high poultry does not fatten so readily. If the weather is seasonable, with crisp, cool nights the fowls of all kinds eat more heartily of the heating, fattening foods given them and take on fat much more rapidly. The general crop is, to be sure, fattened by somewhat primitive methods, but the conditions affecting it also have their influence on the work of those who try more direct and efficient methods, at this and at all seasons. In a very hot summer it is frequently impossible for growers to get chickens as fat as they want them and as is usual.

The conditions under which poultry is kept while fattening are of at least as much importance as the food. To facilitate fattening their activities must be kept as low as possible. They must be confined in small yards, in pens indoors, or in fattening coops, according to the system used.

The food used is generally a food containing starches and fats in larger proportion than is advisable when the question of maintaining condition with a view to future usefulness has to be considered. In fattening the digestive organs by heavy feeding and lack of general exercise for the fowl are weakened. It rests with the judgment of the operator to see that they are not weakened to the danger point before the fattening process is finished, for in that event he may lose all the profit on the operation, even if he saves the stock.



The Simplest Method of Fattening.

The soft roaster growers of what is known as the "South Shore" section in Massachusetts, who produce the finest poultry brought to the Boston market, continue the same system of feeding from the time their chickens leave the brooders until they are sold to be dressed and marketed immediately. Their bill of fare is of the simplest, and the principle upon which their system is based of the soundest.

Cracked corn, beef scrap and water are always before their chickens. Green food is supplied as convenient. Cabbages are used quite freely when grown at home, but I do not think are purchased very extensively. Green rye, sown in the fall on the land about the houses is available whenever the ground is bare, and with many growers this is the main reliance for green food. Their chickens are grown on this diet, and fatten on it as they reach the fattening period of their lives. As they are especially wanted for early summer there is rarely occasion to hasten fattening. Indeed, these chickens are quite as likely to come on a little faster than the grower wants them to, and so be ready for market rather in advance of the period of best prices. While they may be held for a short time after they are well fatted, this is rarely done, for the overfat chicken is not desired, and after the chicken is once well fatted the risk of disease in fat fowls, intensified by the fact that all through life the roasting chicken has been handled with a view to the quality of the meat rather than to strength and vigor, makes it inadvisable to hold it long.

The principle upon which these South Shore soft roaster growers work is this:

To make the best growth and remain soft meated the chicken must be quiet and contented, not disposed to forage or roam about much, but still inclined to take

exercise enough to keep it in healthy condition through its short life. They give it abundance of food. The food is always before it. They give it opportunity to go quite a distance, and trust to the abundance of food to restrain its inclination to wander, while the opportunity to move about is relied upon to induce it to take exercise enough to keep it from going out of condition before it is marketed.

This principle, rule, or method, whichever we call it, is perhaps no better in results in poultry than some of the more elaborate ones, but it certainly produces a fine article at the minimum cost for food and attendance. It should be noted that it is the object of these growers to produce chickens in which the meat *has always been soft*. Their method does not contemplate improving the quality of a hard meated fowl by softening hard muscles, and interspersing them with fat. With them the fattening is strictly a finishing process intended to be carried only as far as necessary to furnish the fat to cook the meat on the fowl.

The Next Step Toward Special Fattening.

The soft roaster growers, as a rule, intend all their chickens, cockerels, (caponized), and pullets alike for market. Their system, as generally operated, does not produce the largest possible chicken from the possibilities with which they start. There is no need that it should, for the method they use gives them chickens large enough for the general demand. But, when a poultryman is growing stock in which the different sexes, or birds of different quality are to be devoted to different purposes, this method does not apply so well. The object, then, is to build up good strong, vigorous, and usually, too, large bodies; and this must apply to all the stock, for not until mature, or nearly so, can the selection of individuals for the different purposes be made. Chickens handled for this purpose for many months would not readily adapt themselves to the method of heavy feeding and reduced activity. They would come to it in time with the inducements it offers them, but when a poultryman has reached the point of culling out the chickens that are to go to market, he usually wants to fit them for market, and dispose of them as quickly as possible. To accomplish this he confines them somewhat closely, and feeds more heavily and more fattening foods.

In the case of partly grown chickens of the small and medium sized breeds, this kind of forcing is likely to give temporarily very rapid growth with a slight accumulation of fat. I used to take Plymouth Rock, Wyandotte, and Buff Leghorn chicks, weighing a pound to a pound and a quarter each, confine them in lots of about forty, in pens 8 ft. square, with yards containing about 300 sq. ft., and feed heavily on corn cake, wheat, and cracked corn, and put eight ounces of weight on each of them in a week. This was my system of handling chicks to dress for broilers. If my orders for broilers left any to grow a little too large for that purpose they were kept under about the same conditions—perhaps a little more exercise and more variety of food for a few weeks, then again given a week of finishing to fit them for “frys,” and at this second fattening they generally put on much more fat.

The method I use at present is more particularly adapted to older fowls, though it slightly improves the condition of those taken from the yard to be killed for our own table at a stage at which they do not readily fatten.

When cockerels are well grown, I plan to have a few fattening all the time until all destined for the table have been used. They are simply shut in a small pen or coop, fed mash the same as the rest of the stock once a day, and for the rest have cracked corn and water before them all the time. On this treatment most of them will fatten as fast as we care to have them, in from one to two weeks, the average being about ten days. If it should happen that any are not killed within two weeks we are quite sure of finding them overfat.

These chickens are full fed and in good condition before being shut up. I think they will run a little harder meat than the soft roasters, as grown by the South Shore method, but there are many specimens just as soft, and the average is very much better than that of ordinary good table poultry.

Other Simple Methods.

When a very rapid increase of fat is desired, and especially when the chickens to be fattened are a little lacking in condition, the fattening process may be hastened in various ways.

When only a small number of chickens are being handled, a very rapid fattening may be made by feeding on a baked johnny cake of corn meal, with occasionally some beef scrap containing much fat or pork cracklings. For a large number of chickens the preparation of johnny cake is too troublesome. Feeding entirely on mash of corn meal and beef scraps may work satisfactorily on chickens that can stand it, but heavy mash feeding exclusively is not to be recommended to a novice. The part grain diet is safer.

Fattening on ground dry feed mixtures is probably not to be recommended for quick work with chickens that have been fed by another system, for if they do not take readily to it valuable time is lost. It should be noted in the instructions already given that the fattening process is simply an extension of the regular system of feeding to which the stock is accustomed. So in dry feeding the feeder trusts in part to confining the chickens more closely and in part to a little more fattening food of the same kind he has been using and fed much the same way to bring about the conditions he seeks. Mr. Park used to fatten his cockerels on a mixture of equal parts corn, oats, and barley, ground very fine and fed dry in hoppers, the cockerels meantime being confined to a grass run and liberally supplied with beef scrap, water, and, sometimes, milk. I presume they would fatten as rapidly by this plan as by mine, but cannot say definitely.

About Machine Fattening.

Of this system of fattening I do not propose to treat at this stage of these lessons. Later on it will be taken up and considered in a special lesson.

Fattening Old Hens.

If I give in precept what I practice I have not much to say about fattening old hens. My experience has been that when through laying for the season which is to be their last with you, the best thing to do with them is to dispose of them at once, whatever their condition. Those that are fat will gain little by keeping. Those that are thin cannot be fattened in a short time, but must be brought up in condition first. Those that are in good condition might gain enough to warrant fattening if considered by themselves, but with the others, and in view of the fact that whatever the scale of operations, I have nearly always had younger stock to which it was worth while to give additional room, I have always felt that I made no mistake in disposing of the old hens in a bunch, letting them go as they were, and I think most poultrymen will find the same thing true.

If, however, one wants to fatten his old hens the best plan is to confine quite closely and feed heavily a ration about the same as they have been getting for a good laying ration. More corn and more meat foods may be added, but with old hens it is not best to feed too heating foods, for they cannot stand it as the young stock will, and a few hens going off their feed and dying will cut into the profit so much that it would have been as well not to try to fatten.



LESSON XX.

Selling Market Poultry and Eggs.

TO DISPOSE of the products of the poultry yard to best advantage often calls for as much knowledge, skill, and judgment as their production. This is a fact that too many "producers" fail to grasp. In common with the mass of producers in all agricultural lines, poultry keepers, especially those located a long way from the best markets, are apt to regard the middlemen and the transportation companies as predatory individuals and concerns levying tribute on goods as they pass from producer to consumer. Much is said of "the middleman's profits." It is assumed that they are large and sure, and the poultry keeper is prone to feel that if in any way he can retain the part of the final selling price of his products which represents the difference between what he gets and what the consumer gives, his business will be much more profitable.

In general there is more error than truth in this view of the case as it applies to the person giving all or much of his time to poultry keeping; and I am not sure that the statement will not apply to all classes of poultry keepers who sell eggs and poultry for table use. Even those located close to good markets often find it unprofitable to try to dispose of their produce direct to consumers. There are, of course, a great many instances where it pays better to sell direct, but still I think the number of cases in which it pays better to sell goods through the regular channels of trade is very much greater. Both from my own experience and from what I have seen, I am so convinced of this that I think one should make all his plans and estimates on that basis unless he is absolutely sure of a direct market under unusually favorable conditions.

Ordinarily the producer who sells direct to consumers, thereby keeping for himself the various amounts which usually go to commission and wholesale dealers, retailers, and transportation companies, does the work of all these himself; and often it costs him more to do it than the difference in the wholesale and retail prices.

He does not always realize this. With his mind intent on "the middleman's profit," it may not occur to him to figure out just what it costs him to sell his produce direct, and how much more he could probably produce by giving all his time to production.

When It Is Advisable to Sell Direct.

If the quantities to be sold are small and can be conveniently delivered without taking time which might more profitably be given to something else; or

If the poultry products can be sold from house to house with other stuff, as milk or vegetables;

If the quantities to be sold are large enough to make daily deliveries;

It may be more profitable to sell direct, though there are very few places where it is possible to make a large route for poultry and eggs alone profitable enough to warrant giving it the time of a man and team. There are many poultry keepers who, while keeping a few fowls, or a stock not large enough to require all their time, find it good policy to sell direct to consumers,

but as the amount they produce increases, the relative conditions change. Where at first they put time in the selling of goods that otherwise would have been unoccupied, as their business increases the time given to preparing and delivering for private families is time that could be used to better advantage right in the poultry yard.

It should be said, also, that the personality of the poultryman is of some importance in deciding such a question as this. Qualifications as a salesman count for as much in disposing of products as other qualifications do in producing them. As some people can produce chickens and eggs cheaper than others, get better results for the same investment or work: so some can sell better than others—can work goods off quicker, and often get better prices as well. Like several other matters we have considered during the year, the question of the best way to dispose of produce finally resolves itself into a question of what a certain individual can do under certain conditions, and the general advice I have given is what fits the case for most individuals in the greatest number of conditions.

Taking up now the special consideration of the different methods of selling poultry products:

Selling Eggs and Poultry to Private Customers.

This means, as a rule, the delivery once or twice a week of an approximately uniform quantity of eggs during the greater part of the year. Most families economize on eggs for a few months when prices are highest; indulge in them more freely when prices are lowest, but during the greater part of the year use the same number of dozens per week. The total number of regular customers a poultryman can take, can never be much greater than the number he can supply when eggs are scarce.

A few families will use poultry once or twice a week, and a few such customers can take the poultry product from quite a large plant if hatches happen to be so distributed through the season that there is something to dress every week. The average family buys poultry about once in two or three weeks, and while such orders help out, unless a route has a goodly proportion of customers buying poultry once a week or oftener, it does not pay to supply it with poultry,—speaking now of a poultry and egg route. If other produce is sold the case may be different.

Selling to Large Consumers of Eggs and Poultry.

Some private families trade would come under this heading, but under it I refer more particularly to hotel, boarding house, restaurant, and soda fountain trade. Opportunities to sell at a premium to this class of trade are not generally as good as they were before the days of modern cold storage methods. The more careful candling and grading of eggs by commission houses has also had its influence on the situation. These and the fact that many such consumers have arrangements with some poultryman for supplies of eggs, make it sometimes hard to find customers of this class. Another thing that works against the poultryman looking for this class of trade, is that so often poultrymen agree to furnish eggs, and within a few weeks or months find themselves unable to keep to their agreement, and the customer is left in the lurch.

If one happens to know or to get in touch with a good customer of this class, supplying this trade is one of the most satisfactory ways of disposing of eggs, but I doubt whether it would pay to spend much time looking for it. The prices obtained from this trade are sometimes as good as the best from family trade, often a little lower, but as the goods are taken in larger quantities the lower price may be actually better.

Probably the best trade of this kind for eggs, and certainly the best for poultry, is at the summer resort hotels in the north, and the winter resorts in the south. For practically all sales direct to consumers poultry must be dressed.

Marketing With One Middleman.

A most satisfactory arrangement when it can be made, is to sell direct to retailers who supply a high class grocery or provision trade. There are many such in every large city, and some in almost all towns, and as they can easily get fancy prices for fancy goods they are

willing to pay something more than regular market prices for goods that suit their trade—provided they can depend on getting them regularly, and always up to quality. For all they can work off in the ordinary course of trade such firms will usually pay the highest market price, taking goods as they come, up to the amount their trade calls for. But if they can be sure of a steady supply of extra choice goods they can make a specialty of them, push them and extend their trade in those lines to the joint profit of producer and distributor.

The common obstacle to making arrangements of this kind is the inability of the producer to keep the volume of his produce steadily up to what he has agreed to furnish; repeated disappointments of this kind make these firms shy of conducting bargains with poultrymen unknown to them or whose ability to live up to their agreements remains to be proved. Hence the poultry keeper looking for a market of this kind is apt to find them quite unresponsive to the inducements he offers them.

The best way to deal with this trade is not to attempt to get it until by experience you know just what you can be reasonably sure of being able to supply week in and week out through the season or the year, and then make an arrangement on that basis. Such an arrangement does not necessarily mean a contract for only what can be supplied when production is at the lowest point, for when production is lowest consumption is generally lowest also, and when production is greatest and prices lowest, consumption is greatly increased. A retailer who wanted two cases of eggs a week in November and December, might want four in April. A producer producing a case of eggs a week in November and December, might have the four cases a week in April, and as many as were wanted during three-fourths of the year, but if he could not meet the retailer's order for the season of slack production, and some one else could, the other party would get the trade. To put it another way, the producer must find a retailer whose needs it is within his ability to supply regularly. Such a customer he can hold if his goods and his dealings are right; but if he can but partly supply a customer his hold on that business is far more uncertain.

Considering this fact with the general disposition of poultry keepers to enter into arrangements of this kind in the spring, and the too common necessity for dropping out of them before the summer is over: while I would certainly not advise anyone to let slip a contract of this kind that came his way, I would emphatically advise one not to devote much time to looking for such customers until experience had shown what quantities of produce he could safely engage to deliver.

It may seem to some that it is as well to endeavor to get this trade for such periods as one can hold a customer each year, looking up a new customer each year if necessary, but as a rule customers of this class are not so easily obtained that one can afford to do this.

Marketing With Two Middlemen.

I can best illustrate this by describing the method of marketing the soft roaster crop of the South Shore section, to which reference has been made a number of times in these lessons.

There few of the growers dress their poultry. It is sold alive to a few firms, some of which are also growers, and these firms dress the stock and distribute it to the retailers. By this method the inequalities of production are quite generally equalized. The grower is not under necessity of supplying a definite number of fowls each week, or at any regular interval. He holds his fowls until they are ready—at their best. The collectors, being in constant touch with many producers, know just what each has and approximately how many he will have ready at any given time, and arrange their collections accordingly, with the result that the trade is satisfactorily supplied, and the producer gets the benefit of a near connection with the retail trade without any of the difficulties of maintaining such connection which beset him when he sells direct to the trade.

The opportunities to sell in this way are not general. They may, however, be found almost anywhere where production is considerable enough to make collecting worth while, and a good retail trade near enough to take the produce while still in first class condition. There are many communities in the territory tributary to the large market centers where collectors of eggs and poultry will handle them for the producer to better advantage than he can handle them for himself.

Marketing Through Common Trade Channels.

Through the country at large poultry products after they leave the producer pass through several hands before reaching the consumer. In many places collectors send wagons all over the country surrounding their headquarters. In other places country merchants receive poultry and eggs direct from farmers, generally in exchange for goods, and forward them to buyers at central points. From these they go to commission houses in the large cities, or to the packing concerns that handle poultry and eggs, and by these are distributed to jobbers and retailers, an article frequently passing through four or five or more hands before reaching the consumer.

Now because each party who handles the article has to be paid for his services, it does not follow that the producer will save by dispensing with those services. He will not unless he can perform them himself at less cost. This he may do in special cases, but usually it is more satisfactory to sell through the general channels, and it is always the better way unless one is sure he has a better arrangement and with reliable parties.

The poultry keeper whose products pass through numerous hands before they reach the consumer, and who perhaps receives not more than half of the retail price, is apt to feel that too large a proportion of the price goes to those who have labored least. Such a view of the matter is superficial. I would not dissuade anyone from attempting to get all he can out of his produce, but I do believe that the mistaken feeling that middlemen get more than their fair share of the profits on poultry tends to keep down the production of poultry, and I want to contribute what I can to the removal of that feeling. Nearly always the poultry keeper profits most by giving his attention principally to production, and putting out his produce through the best channels of trade that reach him, whether these take it through many or few hands.

Holding Produce for High Prices.

Here we have another matter in which producers, endeavoring to get as much as possible out of their product, may make a mistake.

With the perfecting of modern methods of cold storage, the market for limed and otherwise preserved eggs has quite disappeared. There is practically no market for eggs held in producers' hands at prices that will make it worth while to hold them. Whatever may be said of the profitableness of preserving eggs for home use during the period of least production, to hold them to sell at that time is so seldom profitable that the poultryman is wisest who dismisses it from his thoughts, and markets his eggs fresh at the best going prices they will command.

Poultry should be marketed when ready for the use for which it is intended. Broilers and roasters should go at the weights, (and this means weight in good condition), at which they will bring the best prices, and the wise poultryman who is looking for trade in table poultry hatches his chickens as nearly as possible to have them ready when they will bring most money. They may be held a little while, or worked off a little early, according to condition and prices. One does not have to be exact to a day and an ounce; but to sell to best advantage, any lot of chickens has to go about the time it is fit. If held longer it is fed without profit, and may go back and be held at a loss. A fuller consideration of the points that arise in this connection must wait for future lessons on broilers and roasters.

Selling Poultry Alive.

When sold to a special class of trade, poultry is usually dressed by the producer or collector. When sold to the general trade, it is dressed or sold alive, according to circumstances, the principal determining matters being the custom in the vicinity, and the grower's judgment as to which way will give him best returns. Some markets want nearly all live poultry; some nearly all dressed. St. Louis belongs to the former class: Boston has been a conspicuous dressed poultry market, taking comparatively little live poultry, but conditions are changing somewhat, and a great deal of poultry is coming here alive now, and many growers tell me the returns on live poultry are close enough to the returns on dressed to make it a matter of indifference so far as profit is concerned, which way they ship. This has not long been so. Until quite recently a grower who sold good poultry alive for this market generally sacrificed a good part of his profit.

In shipments of live poultry, returnable slatted coops are used, the express companies returning the coops free of charge.

Methods of Killing and Dressing Poultry.

Poultry sold to a private or special trade may be dressed any way the trade will take it. Poultry to be sold dressed to the general trade, should be killed and dressed to suit the market to which it goes. As far as I am informed, all the more important markets want fowls with heads and feet on, and undrawn. There are good reasons for this; the undrawn fowl if properly starved before killing, keeps better than one that is drawn and the air thus admitted to the cavity of the body. The head and feet left on a fowl serve to show more of its age and condition than the average customer would discover without them. In selling dressed poultry to private or special trade, heads and feet are often removed, and occasionally fowls are drawn, though this is rarely done except for customers who request it. If one is selling fowls both ways, the best way to arrange the prices is to weigh all fowls undrawn and charge those whose fowls are drawn the price for undrawn plus a small charge for drawing. When selling dressed poultry to private trade I used to weigh and tag all carcasses singly or in pairs as required, after they were cooled. Then for customers who wanted them drawn we selected the weights wanted, and charged on the original, not on the weight after drawing. I don't think it would be found satisfactory to attempt to make a price for drawn poultry and one for undrawn.

Ratio of Prices for Drawn and Undrawn Poultry.

If a poultryman is selling his poultry all drawn, and wanted to know what to make his price with relation to the price for undrawn poultry, the best way to arrive at it is to weigh an average lot of undrawn poultry, draw and weigh again. Then take the value of the poultry undrawn at the market price, add to it the charge for drawing, divide by the number of pounds the lot weighed drawn, and the resulting figure is the price per pound for the drawn poultry.

Scalding or Dry Picking?

Poultry to be sold in the eastern markets should be dry picked, for dry picked poultry usually sells better and brings a few cents more per pound than scalded poultry. For western markets scalded poultry is preferred for home consumption, but the surplus that is shipped east works out better if dry picked. The method of picking therefore will be determined by where the poultry is to be consumed.

Poultry dressed for private trade will go just as readily scalded as dry picked, unless scalding is badly botched, and as picking after scalding is much easier than dry picking, it is quite generally the practice of those who sell direct to consumers even in this vicinity, unless they have enough to require the services of an expert picker, or to keep themselves in practice dry picking.

How to Kill.

If fowls are to be sold with heads off they may be killed by cutting off the head, in the good old fashioned way.

If the head is to be left on, they should be killed by bleeding through a cut made generally into the roof of the mouth, and penetrating the brain. The method of making the cut has been often described, and some descriptions of dressing fowls have been quite profusely illustrated with photos of different stages of the operations of killing and plucking. The practical value of either words or pictures in teaching such operations seems problematical. When we consider how much practice with expert personal instruction it takes to make a skillful picker, we cannot make a very high estimate of the value of such instruction as it is possible to give on paper. I would advise every one who wants to learn to dress fowls or to learn another or better method than that with which he is familiar, to go to an expert picker for a practical demonstration, if it is at all possible for him to do so. I give herewith several statements of killing methods as given by different experts, and those who must learn by the book may take their choice.

Sticking with the Fowl Held Under the Arm.

In one of the most popular methods the fowl is held under the left arm, breast up, the mouth held open with the fingers of the left hand, while with a knife held in the right hand a cut is made first across the roof of the mouth at the base of the brain, then the knife is turned and a deep cut made to penetrate the brain. The first cut severs an artery from which the fowl begins to bleed to death. The cut into the brain produces insensibility, and causes the feathers to relax so that they may be easily removed.

Then the picker sits down and begins to remove the feathers. This process is rapidly or more slowly performed according to the skill of the operator and the condition of the fowls. A fowl in good condition with full plumage, is generally easy to pick, but the impression given by some writers that if the fowl is properly stuck the feathers come out easily, and if feathers do not come easily the fault must be in the sticking, is wrong—according to the testimony of professional pickers. The pickers say that the same lot of fowls may pick hard in the morning, easy in the afternoon, or vice versa, and this when the sticking is the same and several pickers are working together, so that it is not reasonable to suppose that they are all sticking wrong, even if there were any probability of a single expert doing so. I emphasize this point because a novice who tries sticking and dry picking and finds it not so easy as from the books he got the impression that it was, is likely to puzzle himself over the method of sticking, concluding that he must be at fault there. He may be, but it does not follow necessarily, and he should be able to understand the situation better if he knows that even with experts picking is sometimes hard and slow, and that when rapidly done it is done by *skill and hard work*. A skillful picker will remove most of the feathers from a fowl with a few sweeping motions, but it will take him longer to get the feathers that remain, and if the fowl is full of pin feathers their removal takes some time, no matter how skillful the picker.

The New Jersey Method.

To kill and pluck a fowl by the New Jersey method, Dr. P. T. Woods gives the following directions in "Profitable Market Poultry," published by the Cyphers Incubator Co., a book which contains much of interest and value to those growing poultry for market:—

"Provide two barrels, one for blood and waste feathers, and the other for the feathers that are to be saved. Place these against the side of the wall of the killing house. Have a good sharp knife with a medium sized blade, an ordinary pocket knife will answer. * * *

"A nail should be driven in the wall above the center of the barrel intended for blood and waste feathers, at a point a little higher than the head of the picker. A noose of stout cord a few inches long is attached to this nail. The fowl's feet are secured in this noose, so that the fowl hangs up by its legs against the wall, on a line about level with the operator's shoulders. The fowl should hang in such a position that the operator can readily grasp the head and neck with the left hand, the arm in an almost horizontal position, with the elbow against the side of the body. * * *

"Grasp the neck of the fowl with the thumb and forefinger of the left hand, draw the hand gently downward until it strikes the angle of the jaw, forcing the fowl's mouth open without choking it. Hold the mouth firmly open with the third finger. The knife is first introduced into the throat, and with a couple of quick motions up and down, the larger arteries at the side of the neck just below the ear, are severed so that the bird bleeds freely. Now, hold the knife at an angle with the bird's bill, pointing toward the back part of the roof of the mouth in a line with the eye; with a rapid movement drive the knife through the roof of the mouth into the base of the bird's brain, and give a quick half turn to the blade."

As has already been said, sticking may best be learned by personal demonstration. If that is out of the question, and it is desirable to learn to kill that way, and to dry pick, practice on fowls to be consumed at home until sufficient skill is developed to enable you to turn off a good looking carcass. Meantime pick by any method you know, or hire someone to pick for you, but don't botch the killing of a lot of fowls you want to go to market and bring good prices. Badly dressed poultry will not bring first class prices.

How to Scald a Fowl.

For the novice, scalding is the easier method, and if he has a proper equipment, and uses fair judgment in scalding, he need not spoil the looks of his poultry in the scalding.

If the fowl is to be sold with head on, kill as described above, or make the cut in the neck, severing the head just back of the ear from the body, without cutting the skin more than is necessary to insert the knife.

To scald, have a kettle or other vessel of water just below the boiling point. Have the vessel large enough and enough water in it, to maintain an even temperature and to give room to souse the fowl well and quickly. I used to scald in the set kettle in which we cooked our mash. This was a fifty gallon kettle set in brick work. We would put six or eight pails of water in it, put enough fire under to bring it almost to the boiling point, and cover the kettle until the water was ready. Usually what coals were under the kettle at that time would keep the water hot while we scalded what fowls were to be killed — about thirty to forty at a time. In any case a few pieces of small wood added would keep the water right.

We cut heads off, so had only to take a fowl by the feet, plunge under water and swash about and up and down once or twice, and take out. With a well feathered fowl the water scarcely touched the skin, but the feathers were well wet and steamed up, and were very easily removed.

If a fowl or chicken was poorly feathered or had bare spots we plunged it into the water quickly and took right out. This gave a poor "scald," but avoided damaging the skin.

The common trouble with scalded poultry is that the water is either too hot or too cold, or the scalding done in so small a vessel that the feathers cannot be wet without the skin being scalded.

When the head is to be left on, the fowl must be taken by both head and feet and the feathers wet without the hot water scalding the head, otherwise the head would present a most unattractive appearance.

Cleaning and Cooling.

Whatever method of killing and plucking is used, the carcass should be clean, well plucked, and made as attractive as possible. Slipshod and slovenly dressing will make good poultry grade low. There are several things which detract from the appearance and selling value of poultry as it reaches the consumer.

The first of these is the fitting of poultry for killing. It should be kept without food for at least twenty-four hours before killing, that the crop and intestines may be empty. If the crop contains food the carcass looks bad, and the food souring in it may taint the meat. If the intestines are not empty their contents may affect the meat of the parts near them. For looks, quality, and keeping properties, the starving before killing is necessary.

Many fowls well killed and well plucked, are not made clean before being sent to market. Blood is left on the head and mouth, and often manure on the feet, and bloody smears on the skin. The carcass should be clean, the parts to be cut off as well as what is to be eaten.

A great deal of dressed poultry begins to spoil before it reaches consumers, or spoils quickly in their hands, because it has not been properly cooled. This is the trouble, too, with much of the poultry the grower thinks is first class, while dealers and buyers rate it lower. Poultry that has not been properly cooled spoils quickly, and is apt to be flabby and insipid.

Place the carcasses as soon as dressed clean in cold water. Running water is best, but still water changed a few times will do. In hot weather it is best to use ice. Thorough cooling requires several hours. It will do no harm to keep the carcasses in the cold water all day, or over night, and that may be advisable if the weather is warm. If the weather is cool enough it is better to take the carcasses out of the water when cool, and hang in a cool place until ready to pack them.

The object of cooling is to get the animal heat out of the body as quickly as possible. If this is not done decomposition sets in almost at once, and advances rapidly, and the poultry which leaves the producer's hands apparently in fine condition reaches its market in bad shape, the shipper gets returns for a lower grade of stuff than he shipped, and often concludes that the parties he shipped to were dishonest, when the fault was all his own.

LESSON XXI.

Selling Exhibition Stock and Eggs for Hatching.

FEW keepers of thoroughbred fowls do not have some opportunities to sell stock and eggs for hatching at better prices than would be obtained from common stock. Nearly all want to take advantage of such opportunities. A great many regard them as beginnings of a trade which may develop to proportions which will warrant their giving their time exclusively to this business.

Advertising.

Some opportunities to sell come without "advertising." To all who see it a nice flock of fowls is its own advertisement, and is sure to excite in some a wish to have some of the same stock. Whether this unsolicited demand for stock and eggs would alone become worth while, depends mostly on the location. In a section where the poultry interests are as yet little developed, it would not be likely to amount to much for some time. In places where the interest is good and growing, a poultryman located where many passers by see his stock, will sometimes be able to do quite a large trade without advertising in the public prints, but in most cases the man who wants to sell fowls and eggs to any substantial amount must make announcement of that fact through mediums which reach many more people who want to buy than see his stock accidentally. Where one man may build up a local trade without advertising a hundred to get the same volume of trade must advertise judiciously and continuously.

The poultry papers are unquestionably the best mediums for advertising poultry and eggs. They circulate almost wholly among people interested in poultry and possible buyers of stock and eggs. Some of them have a proportion of sample copy and premium circulation to people who do not read them, but, as a rule, the papers go to persons especially interested in poultry and in the habit of looking through their poultry papers for advertisements of anything in this line they may want. Farm papers as a class are far below the poultry papers as mediums for advertising poultry, though a few farm papers giving especial attention to poultry are good. Daily and weekly local papers it is seldom worth while to advertise poultry in. Occasionally one will make something of a specialty of poultry advertising, especially in the Sunday paper, and give very good returns, but these cases are exceptional. Oftener the money spent in advertising in them might as well be thrown away. Some years ago I ran three inch ad. for a month in the height of the egg season in one of the best positions in a daily paper without making a single sale. At the same time an ad. published in a poultry paper published several thousand miles away was bringing me customers right in my home town who read the local papers every day, yet never saw the ad., because they were not thinking of poultry when reading it. When they took up their poultry paper they looked all through it, looking particularly for ads. of breeders near them.

Which Poultry Paper, and How Much Space.

The best advertising medium for the beginner should be the paper having the largest circulation in his vicinity and section, for until he makes a reputation that extends beyond his own locality most of his sales are likely to be to people living not far from him. This rule will not, however, always hold good for large — and much less for small advertisers. In some papers the small advertiser has little show, every effort of the publisher being directed to drawing the attention of readers to the larger advertisers; in others, small advertisements are relatively as profitable as large ones. In any paper, though, a small ad. may run for some time without attracting attention or making sales, hence the beginner in advertising should keep his advertising expense within what he is able to stand though no sales are made, for while it is true that the volume of business done through a paper has some relation to the amount of space used in it, large ads. alone do not always attract attention in the way the advertiser wants them to; and if a poultryman with no reputation and no experience in advertising relies upon the pulling power of size in his ads. he is likely to be disappointed. In a paper like FARM-POULTRY, with the small ads. classified and given a place in the body of the book on reading pages, the small classified ad. is the best beginning for most small advertisers.

How to Write an Advertisement.

Your advertisement should be a brief plain statement calling attention to what you have to sell, and generally giving your prices or range of prices. The object of the advertisement is not to sell the stock directly through the advertisement. It is simply an announcement for the purpose of putting you in communication with persons who want goods of the kind you have to sell. Occasionally buyers order direct from an ad. Often some correspondence passes before a sale is made. The prime object of the advertisement is to bring you the names of possible customers, and that is the most that a paper can do for an advertiser; further results depend upon himself.

Whatever the expert advertiser may do, the beginner should avoid fantastic effects either in statement or in mechanical arrangement of an ad. Make your statement straightforward, to the point, and without a superfluous word.

Answering Correspondence.

Every letter received from an ad. should be given some sort of reply promptly. The average inquirer writes to a number of advertisers at the same time, and those who reply at once stand the best chances of making sales. As a rule, the reply should be limited to matters pertaining directly to the business transaction. Many persons in writing about stock or eggs ask for more or less information on other matters. These questions may properly be passed with the statement that you cannot take time to reply to them. To decline to reply to such questions, and to give straightforward replies to pertinent questions, is the best policy.

Have neat and appropriate stationery, letter heads bearing your name and that of the breed or breeds of fowls you keep, and as much general information about them as seems appropriate and can be used without crowding too much printed matter on the page, and envelopes with your name, address, and the name of your yards, or farm, or of your breeds. It pays to be modest in these announcements. Don't proclaim yourself a specialist in any breed or variety until you really have gained some recognition as such. I get many letters from poultrymen calling themselves specialists in the breeds they keep, asking me the most elementary questions about those breeds, and about the general principles of breeding; and I often wonder what sort of letters these specialists write to their business correspondents, and how the letters read to the latter. I am sure the prospective customer must often see through the pretensions implied in the use of such terms and the exaggerations in the letter head notices of the stock, and a customer is lost when otherwise a sale would have been made. If you are new in the business and feel tempted to make as strong claims in your advertising as some of those who have been at it much longer, remember that only those as new or newer than yourself are likely to fail to see through it, and you virtually limit your sales to this class, while, if you really have good stock a plain and unpretentious statement of the fact is likely to bring you a proportion of trade from those who really know something about it, and know when they get what they order and good value for their money.

The beginner is apt to think that he can only sell to novices, anyway. This is a mistake. Many a beginner has stock that older hands are glad to get, and will pay him more for than beginners would. The profit in the thoroughbred poultry and egg trade depends on selling to those who can use good stock and will pay for it. A trade that is limited to low priced stock can be a profitable trade only when conducted on a very large scale.

The Question of Values.

How much better than market prices one may obtain for eggs and stock depends upon several things, most important of which are—the stock—the demand—the poultry keeper himself.

The basis of values of poultry and eggs is their market value. Whatever can be obtained for them over and above market prices represents generally the amount of the premium some one is willing to pay on some superficial quality he sees in the stock or on expectations of what he hopes to realize from it. The beginner who grasps that fact will find it easier to adjust himself and what business he does in thoroughbred poultry and eggs to the conditions of the business.

The market values of eggs and fowls are their bed rock values. There is an open market for eggs and table poultry, and in this market, with an occasional slight exception, one man's stuff brings the same price as any other stuff of the same quality. When we come to breeding and exhibition values we have values from an entirely different standpoint. Mr. B., who is a beginner in poultry, has stock from Mr. M., who, we will say, is a leading breeder of White Wyandottes. His stock is better than that of Mr. P., who has some reputation as a breeder of White Wyandottes, but not equal to that of Mr. M.

Now if values in this line were absolute, or governed by fixed standards, Mr. B. should be able to sell his stock for the same price as Mr. M. does, and for better prices than Mr. P. does. But Mr. B. usually finds that he has to sell such fowls and eggs as he does sell at lower prices than those P. gets, and away below those of M., whose stock is practically the same. He may happen to have a better bird of M.'s stock than M. has, yet he cannot begin to get the price for it that M. would. There is nothing strange and nothing wrong in this situation. The prices of "fancy" stock are governed to some extent by quality by the fancier's standard, but to an equal or greater extent by the reputation of the seller. This reputation is based on the results of years of breeding, exhibition, and selling of stock, and while the degree of reputation depends on these things, the extent of the reputation depends more on the individuality of the man in question, on his ability to sell goods, and on the volume, persistence, and effectiveness of his advertising.

The reputation which enables a breeder to get very high prices for what he has to sell represents years of hard work and the investment of a good deal of money, and it is something that cannot be transferred. It attaches to the breeder rather than to the stock.

The beginner must be satisfied at first to sell stock for less than older breeders are selling stock of the same or inferior quality, but he ought not to put prices so low as to discredit his stock, or attract only the cheapest trade. It is better to market it than to do that.

About the specific prices to be fixed, it is hard to advise, and equally difficult to describe the sort of stock that should be used to fill an order at any specified price. Accurate knowledge along this line comes, to those to whom it does come, only through experience in buying and selling and observation of the purchases and sales of others. It depends very much on judgment of quality, and it is in this respect that a great many beginners fail, mistaken judgment leading them sometimes to give culls where they should send some of their best birds, or to use very valuable birds to fill orders at low prices. There is no intentional dishonesty or special favoring here, and the seller himself suffers more than anyone else from his mistakes, but the efforts of people who know neither quality nor values to do business in thoroughbred poultry have a most unsettling and deplorable effect on the general trade in what we may call the low grades of good stock. Much of this trouble would be avoided if poultry keepers would refrain from selling stock until they were in a position to supply the produce of their own breeding.

If I were to attempt to give rules to govern in the sale of stock, I would give a few simple

rules like the following, which I wish it understood are offered simply as suggestions, though stated more in the form of rules. Few rules could be given to suit all cases, but each may apply the suggestions as far as he sees fit:

1. Never sell a fowl that you need unless you are sure you can replace it with a better one and make something on the transaction.
2. Never send out an unhealthy, undersized, or deformed fowl on a mail order. To persons who see the stock and know its faults, and buy understandingly, such stock may be sold — though it is a question whether it pays the seller to dispose of it for stock purposes at any price.
3. If you are entirely new in the business and can get an expert's advice in the matter have him sort over what stock you have to sell, and give you the approximate values of each lot. Some people have their birds scored and sell by the score, but private scoring is so much in disrepute through the abuses that develop in connection with it that it is probably as well to sell by description.
4. Always describe a fowl fairly; you may lose some sales by doing this, but in the long run will hold more customers.
5. Always sell stock on approval, giving the purchaser the privilege of returning the fowls promptly if not satisfactory.
6. If you find you cannot fill an order with stock of the quality you know should be used, return it or advise the customer of the situation, state what you can do, and await instructions. Don't try to piece out an order with inferior birds and take chances of the customer accepting them.
7. Keep the stock you have to sell in good condition, and keep it separate from the stock you reserve. Have at least enough of it to fill one or two short orders where you can get it easily, at a moment's notice, if need be, and send it away in condition that will not discredit you.

Shipping Stock.

Coops for shipping fine fowls are now sold in knock down bundles so cheaply that unless one has lots of spare time it is cheaper to buy them than to make shipping coops. They come in a variety of sizes, and can be put together in a few minutes. If one is making only an occasional shipment, and it is not worth while to purchase a supply of coops, any light box of suitable size may be used, but if it is an object to advertise oneself through these shipments, care should be taken to use neat, clean boxes.

For shipments that are to be on the road only a day or thereabouts, a little less grain than would be fed the number of fowls in the coop if at liberty, may be thrown on the floor of the coop, it having been previously covered well with chaff, and a good sized piece of mangel or of cabbage will furnish succulent food that makes watering in transit unnecessary in moderate weather. In extremely warm weather do not ship. Do not send fowls off in a cold snap. For long journeys water cups must be provided, fastened in the corner of the coop in such position that the water may be poured in through the space in the top. Grain for long distance shipments may be put in a small bag tied to the coop in such manner that the expressman can get at it easily. Vegetables should be placed in the coop.

When shipping, notify the customer so that the notice will reach him either with or a little in advance of the fowls. Do this though you may previously have advised him when you would ship. If you know or have reason to suppose that the customer is "green" about handling stock, advise him in your letter to be careful about giving water freely at first. Tell him briefly how it has been fed, that he may avoid a radical change. Urge him to keep the new birds isolated from the rest of his stock for a week or two. This last is a special measure of self defense. If the customer has latent disease among his stock, your healthy birds put in with the rest might contract the disease in virulent form, and you would be blamed for having sent him sick stock, when, as a matter of fact, the fault was his.

The Season for Sales of Stock.

The breeder who has a large and long established trade makes some sales the year round. The beginner's sales of stock are usually limited to a few months immediately preceding the

breeding season. December, January, and February will see the most of his sales, and he need not feel discouraged if he finds no demand until well on in January. The class of trade he will get at first does not buy freely until signs of spring begin to be in evidence. A few warm days at any time after New Years is apt to have a marked effect on inquiries for stock.

Selling Eggs for Hatching.

Like the trade in stock, the egg trade is for most poultrymen limited to a short season. Comparatively few shipments of eggs are made until the season is far enough advanced to make it likely that the weather will be somewhat settled by the time the chicks are hatched.

If one sells eggs he should sell from the same matings he uses himself. He may occasionally reserve a few birds in special matings, but even so, these special matings should be experimental rather than in the way of reserving the cream of his stock, unless the eggs sold are offered at a price away below the value of eggs from the birds reserved.

Many breeders who hatch large numbers of chickens for themselves make a practice of dividing the eggs equally day by day, reserving half and using half to fill orders. Others whose egg trade is larger in proportion to their ability to supply it, find it necessary at times to ship all or nearly all of their eggs just at the season they most want them for themselves, or else return many orders. A breeder who sells himself short of eggs at the best hatching season runs the risk of crippling himself for stock at the end of the season.

Whatever practice is followed, the seller must be fair to his customer, remembering that it is chances the customer buys in eggs, and giving him "a square deal" both with reference to himself and to other customers.

And whatever breeders of reputation may do about sending out inferior looking eggs from fine specimens, the novice in the business will find it his best policy to send out none but good looking eggs.

In the matter of guaranteeing fertility, most breeders do not guarantee fertility, and replace eggs that fail to hatch only when from what they know of the way their eggs are hatching they feel that they ought to do so. Some guarantee a certain per cent hatch, if the infertiles are returned to them.

For shipping eggs the boxes and baskets made especially for that purpose are, all things considered, most satisfactory to use.



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